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Notes and Comments

British Standards

OF just over forty Standard Specifications, embracing all branches of engineering, issued by the British Standards Institution in 1931, twelve were of direct interest to the chemical and chemical plant manufacturing industries; and in the light of the reorganisation which has been carried out in recent months, particularly the establishment of the Chemical Division of the Institution, there is every reason to anticipate considerable development in the coming months. Particulars have appeared in the columns of THE CHEMICAL AGE from time to time of the various specifications issued during the past year, and through the courtesy of the Institution we are now able to give an outline of some of the work put in hand, which promises to provide the plant manufacturers with much useful assistance in the near future. A specification has been prepared and will shortly be issued in which recommendations are laid down with regard to the size and position of manholes in chemical plant. These recommendations are being drafted in view of the special precautions which are necessary for containers where poisonous and other gases may be present when they are opened for inspection or cleaning. A committee has been appointed to prepare British Standard Specifications for containers for acids and other materials, such as glass carboys, metal drums and tank wagons. The committees are just commencing their work, and in view of the wide field to be covered it may be some time before their recommendations will be available. Further work in regard to the preparation of a specification for sieves and screens for commercial purposes is in hand, and a questionnaire has been widely circulated to industry to ascertain what the trade requirements are. When the results of these have been considered, further work on the standardisation of sieves and screens will be undertaken. A committee is also considering the preparation of British Standard Specifications for welded containers based on the recommendations that have been included in the report of the Department of Scientific and Industrial Research. Proposals are shortly to be issued for the purpose of identifying pipe lines in chemical works. It is realised that it would not be possible to evolve a scheme of identifying the pipe lines according to the contents owing to the large number of colours that would be required. A method has accordingly been evolved for indicating the character of the material in the pipes, that is, whether it is inflammable, explosive, toxic, corrosive, pressure or safe.

Control of Industry

MR. W. A. S. CALDER'S presidential address to the tenth annual corporate meeting of the Institution of Chemical Engineers on February 19, was a statesmanlike review of one of the most important current problems of industry, and provided much material for reflection on the part of those who are entrusted with the control of chemical manufacture to-day. In an analytical examination of the broad aspects of industrial control, he put his finger on some of the weak points in works organisation and brought into prominence the marked advances which have been made in recent years. Speaking of the benefits of sport and recreation, he pleaded for moderation, and cited the legend of a company whose successful industrial career was brought to an untimely end by the disproportionate attention paid to its prize brass band. His references to the investigation of works accidents were particularly noteworthy. There is already in existence—notably in the South Metropolitan Gas Company and

a few other large concerns—an "inquest" system by which workmen share in the exhaustive investigation of accidents with a view to the prevention of similar mishaps and the judicious apportionment of blame wherever there is ground for it, and Mr. Calder is a keen advocate of the application of some such system to industry in general.

Another aspect of industrial control on which he dwelt was the disposal of liquor effluents and gaseous escapes. In this connection, he expressed the view that much more might be done in the direction of turning these undesirable factors to good account, and reminded his hearers that in some localities even grass is now grown where previously such a phenomenon was unknown.

A Promising Outlook

THERE are definite signs that the dawn of prosperity is breaking, and it will come as welcome news to the chemical industry that some of the most unmistakable of these signs are to be found within its own sphere. Sir Harry McGowan, chairman of Imperial Chemical Industries, Ltd., who was the principal guest at the annual dinner of the Institution of Chemical Engineers, announced that his company's sales of heavy chemicals in this country for the first six weeks of this year showed an advance in various lines of from 10 to 20 per cent. over the corresponding period of last year. Imperial Chemical Industries may be regarded as a barometer in regard to heavy chemicals, and it is highly satisfactory to have this indication that the tide of prosperity, which was at such a low ebb throughout 1931, has turned.

There is a general hope and belief in the chemical industry that by the change in our fiscal arrangements a new era of prosperity has opened in this country, and with the practical evidence which has been afforded by Sir Harry McGowan's announcement there will be renewed confidence in the future. We hope next week to deal with the effect of the new tariffs upon the general welfare of the chemical industry, and we shall welcome information from manufacturers as to the tendencies of their own operations in the present situation.

Creosote Publicity

REFERENCE was made in THE CHEMICAL AGE last week to the exhibition, under the auspices of the National Creosote Committee of the Association of Tar Distillers, of an exceptionally interesting and instructive film dealing with the wood preserving characteristics of creosote. The film was produced by a German film producing concern under the auspices of the Continental Creosote Committee, a circumstance which prompted a correspondent to call attention to the unique fact that a British industry was making use of a foreign film to further its propaganda efforts. We are glad to publish in the present issue a letter from Mr. H. Dobinson, who holds the dual office of general manager of the National Creosote Committee and chairman of the Film Committee of the British Wood Preserving Association, pointing out that not only was Great Britain first in the field in its utilisation of the film for the purpose of advertisement, but that is was the exhibition of the British film at Amsterdam two years ago that prompted the Continental Committee to copy its example. Moreover, we learn from Mr. Dobinson that the Timber Trade Federation is at present engaged in work with a view to improving and adding to the British film.

To be effective, creosote propaganda, like any other form of advertisement, must be more or less continuous, and the fact that Mr. Dobinson appears to be surprised that there should be anyone so ignorant as not to be aware of the existence of the British film is in itself an indication of the necessity for persistent effort.

Books Received

A HISTORY OF FIRE AND FLAME. By Oliver C. de C. Ellis. London: Simpkin, Marshall, Ltd. Pp. 440. 15s.

ASSOCIATION THEORY OF SOLUTION AND INADEQUACY OF DISSOCIATION THEORY. By Jitendra Nath Rakshit. Calcutta: S. C. Auddy & Co., 58 and 12 Wellington Street. Pp. 298.

CHEMISTRY AT THE CENTENARY (1931) MEETING OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE. Cambridge: W. Heffer & Sons, Ltd. Pp. 272. 7s. 6d.

ECONOMIC CONDITIONS IN MOROCCO, 1930-1931. London: H.M. Stationery Office. Pp. 75. 2s.

LUBRICATING OIL TESTS AND THEIR SIGNIFICANCE. By J. E. Southcombe. London: Henry Wells Oil Co., Ltd. Pp. 88. 2s. 6d.

RECENT ADVANCES IN THE FERMENTATION INDUSTRIES. By J. Vargas Eyre. (Streatfield Memorial Lecture, 1931.) London: The Institute of Chemistry. Pp. 20.

SULPHUR BACTERIA. By David Ellis. London: Longmans, Green & Co. Pp. 261. 21s.

TEXTILE RECORDER YEAR BOOK, 1932. Edited by John Brooks. Manchester: John Heywood, Ltd. Pp. 878. 7s. 6d.

THE DONNAN EQUILIBRIA AND THEIR APPLICATION TO CHEMICAL, PHYSIOLOGICAL AND TECHNICAL PROCESSES. By T. R. Bolam. London. G. Bell & Sons, Ltd. Pp. 154. 9s.

THE LIFE AND WORK OF PROFESSOR WILLIAM HENRY PERKIN. London: The Chemical Society. Pp. 138. 3s. 6d.

THE WORK, WEALTH AND HAPPINESS OF MANKIND. By H. G. Wells. London: William Heinemann, Ltd. Pp. 850. 10s. 6d.

The Calendar

Mar. 1.—Institute of Chemistry. Annual general meeting. 4.30 p.m. 30, Russell Square, London.

Mar. 1.—Hull Chemical and Engineering Society. "Exploring the Depths of the Ocean." A. C. Hardy. 7.45 p.m. Grey Street, Park Street, Hull.

Mar. 1.—Chemical Engineering Group and other learned societies. "Some Problems Connected with High-Speed Compression-Ignition Engine Developments." C. B. Dicksee. 7.45 p.m. Caxton Hall, London.

Mar. 1, 8, and 15.—Royal Institution. "Detonating Substances." W. E. Garner. 5.15 p.m. 21 Albemarle Street, London.

Mar. 2.—Society of Public Analysts. 8 p.m. Burlington House, London.

Mar. 3.—Institute of Metals (Birmingham Section). "Gases in Metals." S. L. Archbutt. 7 p.m. Chamber of Commerce, New Street, Birmingham.

Mar. 3.—Chemical Society. Ordinary scientific meeting. 8 p.m. Burlington House, London.

Mar. 3.—Society of Chemical Industry (Bristol Section). "Commercial Explosives." Dr. Wm. Cullen. 7.30 p.m. University, Bristol.

Mar. 4.—Institute of Metals (Sheffield Section). "Defects in Spoon and Fork Blanks." W. R. Barclay. 7.30 p.m. University, Sheffield.

Mar. 4.—Society of Chemical Industry (Manchester Section). "Synthetic Resins with Special Reference to their Application in the Paint and Varnish Industry." E. A. Beaven and Dr. F. J. Siddle. 7 p.m. College of Technology, Manchester.

Mar. 4.—Royal Institution. "Michael Faraday and Electro-Chemistry." Brig.-General Sir Harold Hartley. 9 p.m. 21, Albemarle Street, London.

Mar. 7.—Society of Chemical Industry (London Section). "The Use of Ultra-Violet Light in the Works Laboratory." W. H. Nuttall. 8 p.m. Burlington House, London.

Mar. 8.—Institute of Metals (Swansea Section). Annual general meeting. "Metallography in Industry." Roosevelt Griffiths. 6.15 p.m. Y.M.C.A., Swansea.

Mar. 9.—Institute of Metals. Twenty-fourth annual general meeting. 10 a.m. in the Hall of the Institution of Mechanical Engineers, Storey's Gate, London. Annual dinner and dance. 7 p.m., at the Trocadero Restaurant, London.

Mar. 10.—Chemical Society. Third Pedler Lecture by Professor L. Ruzicka. 5.30 p.m. Institution of Mechanical Engineers, Storey's Gate, London.

Mar. 10.—Society of Chemical Industry (Nottingham Section). "The Economics of High Temperature Carbonisation." Dr. E. W. Smith. 7.30 p.m. University College, Nottingham.

Mr. W. A. S. Calder on the Control of Industry

Presidential Address to the Institution of Chemical Engineers

Mr. W. A. S. Calder delivered his presidential address at the tenth annual corporate meeting of the Institution of Chemical Engineers on February 19, at the Hotel Victoria, London, taking for his subject "The Control of Industry."

A SYSTEM of control should broadly include the following: (1) Control of the actual detailed operations, (2) control and direction of personnel, (3) controlling supplies of necessary materials, (4) obtaining the necessary markets, (5) improving present processes and developing new ideas by research, (6) design, construction and maintenance of output of plant, (7) recording the doings of all departments, and costing, and (8) providing and safeguarding the sinews of war. In this country we have a class of workmen second to none, for skill, devotion to their duties, and above all, their appreciation of efficient higher control. Such efficient higher control obviously includes a sympathetic understanding of their needs and difficulties, and regards their protection from unnecessary risks as one of its primary functions. There is nothing, in my opinion, more calculated to secure a feeling of contentment than that every one employed should feel that a policy of an "ever-open door" for suggestion or complaint is at their disposal. This is comparatively easy in the case of small organisations where a wise and sympathetic employer can carry out this policy in its literal sense, so that every one can feel in the case of fancied injustice that there is a real and material door through which he can gain access in order to present his case.

My personal experience of such a policy is that there is not the slightest risk of this privilege being abused and that the knowledge of its existence tends to prevent the possibility, except in very rare circumstances, of there being any necessity for its use. As the size of the establishment increases, the obvious difficulty of such a course of direct appeal becomes greater, but this does not mean that there is no possible solution of the problem. As an actual fact, it is quite possible to secure the same policy of providing an opportunity for all concerned to have such an open door for their use.

If the chief has the necessary capacity for sympathetic understanding, as well as the other more obvious requirements, a feeling can be engendered by which every employee can realise that not one, but a succession of open doors are at his disposal, should he feel that he is the victim of injustice or that his powers of constructive suggestion are being baulked. The feeling that the man in supreme command is insistent on every one being given a square deal and has provided suitable channels for obtaining information of any individual hardship, can and does create a feeling of loyal confidence in all ranks, and of contentment. It must not be inferred that all grumbling will be prevented. As a nation we have a special gift of appreciating to the utmost the disadvantages of any system with which we are connected, and it is safe to say that when the average Briton ceases to grumble he should at once seek medical advice. Much good may be done by the adequate provision of sport and social recreation for all who desire to participate. In this connection a wise moderation is the key-note.

The next rank in the system of control comprises those who have the direct supervision of the workers and their leading hands, charge hands, or foremen. This section includes all branches of the service, together with the construction, maintenance and operating of the various plants, and it is in this connection that the chemical engineer usually puts his foot on the first rung of the ladder. In his relationships with his colleagues and superiors there is only one thing in which he should be greedy; whenever anything goes wrong, and as is well-known, nothing ever goes right without this occasionally happening, his greed should be displayed in attaching all possible blame to himself. This does not, of course, mean that those who, of his subordinates, were detailed for responsibility should not have their fair share of the blame duly handed on to them by him. In his work he must, of course, include the collateral branches which provide for the improvement of existing processes, investigation of new ones, supply of materials and above all, the all-important problem of obtaining the requisite markets.

I should here like to refer to the importance of the analytical control. In the past this has been a department which has not been so fully recognised as it deserves, and undoubtedly much time has been wasted and friction engendered by wrong results, the majority of such errors being due to slipshod ideas in connection with the exceedingly difficult art of sampling. The handling and protection of the operatives in large establishments obviously demands a labour department. Such a department, to secure full success, must constitute an integral portion of the works management.

I have comparatively lately become a convert to the works council system. Adequate representation of the workers themselves, with full rights to air their views freely, is one of the most essential parts of a works council, and the management, if wise, makes no attempt to do other than lead the members along the right broad general lines and to confine the scope of the council's activities within due bounds.

The question of safety is of such paramount importance that while the full sympathy and co-operation of the Council should be ensured by the use of safety sub-committees and while the appointment of safety officers is not only desirable but necessary, it must still remain one of the most important duties of the management. A vital interest by all concerned, from the supreme control downwards, is not too much to require on such a point. There are still many accidents which should not occur. After any serious accident a really complete and searching inquiry should be made, primarily with the object of putting a bolt on the stable door to prevent the loss of another horse.

We then arrive at the somewhat vexed question of the desirable extent of State control of industry. Many of us were at one time disposed to swell the chorus of "hands off industry." Experience, however, has taught us that, properly administered, there is a distinct advantage in some measure of State control. There are some departments, one of which occurs to mind is the Alkali Works Inspection Department of the Ministry of Health, which have so far won the confidence and regard of their victims that I am sure many of us would nowadays fight, were it necessary, for their retention. So wisely has this department been administered that the "hands" have in practice proved helpful and in no way strangling.

It is also a gratifying feature of Government control that the co-operation of industrialists is now sought in framing regulations. In some cases a wise action on the part of the trade, by setting their house in order, has resulted in avoiding Government rules being laid down. In this connection the various associations and federations can play a most useful part, speaking as they are able to do, on behalf of the whole trade, instead of merely representing individual organisations, however large they may be. I should like to pay personal tribute to the successful efforts of the Association of British Chemical Manufacturers and to the Chemical and Allied Employers' Federation, in this direction.

We then pass on to the question of the supreme command. In this connection I am convinced that we are one of the most fortunate of nations. The pre-war idea of a semi-divine hierarchy, handed down from one generation to another, has definitely passed and only where justified by personal efficiency does such succession usually take place. We may possibly have let this pendulum swing a little on the reverse side and nowadays the son of a distinguished father may even be under some slight handicap. Happy is the organisation where the supreme command is vested in one who, besides having a co-ordinating grip of all the varied branches, has also a finely developed sense of proportion, which is probably one of the most essential gifts for those in the control of industry.

Tricresylphosphate in Switzerland

THE present Swiss consumption of tricresylphosphate and triphenylphosphate is estimated at about 1,500 kilos., chiefly used as plasticisers for leather, varnishes and films. The only Swiss manufacturer of these products, The Society of Chemical Industry in Basle, have discontinued production.

The Institution of Chemical Engineers

Tenth Annual Corporate Meeting

The Institution of Chemical Engineers held its tenth annual corporate meeting at the Hotel Victoria, Northumberland Avenue, London, on Friday, February 19, under the presidency of Mr. W. A. S. Calder, whose presidential address is reported on page 181. Although this year's meeting was confined to one day, there was no lack of interest in the proceedings, and an optimistic note was struck at the annual dinner, at which the principal speaker was Sir Harry McGowan.

THE PRESIDENT, in opening the meeting, said that since the members had last met, fate had flung a heavy scythe, for they had lost the Institution's hon. secretary, Professor J. W. Hinchley, to whom they had already paid proud tribute, and within the last few days they had lost their first president, Sir Arthur Duckham. He expressed on behalf of the Institution the deepest sympathy with Lady Duckham and her family. He then introduced the new hon. secretary, Mr. H. W. Cremer.

The Annual Report

Mr. H. W. Cremer presented the Council's report for the past year. With regard to membership, he said, the net increase during 1931 totalled 39, bringing the total to exactly 700. The report acknowledged the whole-hearted service rendered by the late Professor Hinchley to the Institution during the entire period of its existence. Chiefly as the result of the discussion initiated at the last annual corporate meeting by Mr. J. Arthur Reavell, on the education and training of the chemical engineer, the Education Committee had paid special attention to this matter. It was fortunate in having Sir Frederic Nathan as chairman. Under his able direction much progress had been made, and a satisfactory number of inquiries had been received concerning the training and experience necessary for membership of the Institution. The fact that the number of examination candidates was increasing was another hopeful sign, and it was satisfactory to have the testimony of past candidates as to the valuable experience they had gained by sitting for the Institution's examination.

Reference was made to the splendid progress effected at University College, London, where the new building for the Ramsay Memorial Laboratory of Chemical Engineering was recently opened by H.R.H. Prince George. A tribute was paid to Mr. S. G. M. Ure (hon. editor), Mr. T. Campbell Finlayson (hon. librarian) and Mr. H. J. Pooley (director of the appointments bureau). The bureau had experienced a year of great difficulty, and that had been met by record efforts on the part of Mr. Pooley, with encouraging results. Mr. Cremer made particular reference to the progress of the Graduates' and Students' Section of the Institution, which was run on business-like lines and contained some of the keenest spirits in the Institution. The proposed visit of the American Institute of Chemical Engineers to this country, which was to have occurred this year, had been postponed by mutual consent until a more favourable time, and it was hoped that it might be found possible to hold the joint meeting in 1934. The Council expressed its grateful thanks to Mrs. Hinchley for the presentation of three portraits which the late hon. secretary had wished to become the property of the Institution. The subjects were Sir William Ramsay, Sir Hugh Myddelton (a portrait by Mrs. Hinchley after Jansen), and Lord Moulton.

Officers and Council

The officers and members of Council elected for the ensuing year, as the result of the ballot, were as follows:—

President, The Rt. Hon. Viscount Leverhulme; vice-presidents, Mr. Geo. Gray and Dr. W. H. Hatfield; hon. secretary, Mr. H. W. Cremer; hon. treasurer, Mr. F. A. Greene; membership of Council: Professor W. E. Gibbs, Mr. W. MacNab, Mr. P. Parrish, Mr. F. H. Rogers, and Mr. W. D. Graddon (associate member).

Lord LEVERHULME, expressing his thanks for the honour of being elected to the presidency, suggested that it would be to the benefit of the Institution if, during his year of office, it should have the assistance of Mr. Calder as chairman of the Council, and Mr. Calder had kindly consented to carry out these duties.

The PRESIDENT then presented medals and certificates for 1931 to the following:—The Osborne Reynolds Medal (for the most meritorious service for the advancement of the Institution during the year) to Mr. H. Talbot; the Moulton Medal, to Mr. N. E. Rambush and Mr. F. F. Rixon, for a paper on "The Gas Generator as a Direct Producer of Metallurgical Products"; the Junior Moulton Medal and prize of books, to Mr. M. L. Nathan, for his "Report on High Temperature Heat Insulation; a Correlation of Existing Data."

Votes of thanks were accorded to the retiring president and to the other hon. officers and members of Council for their services to the Institution.

International Congress on Chemical Engineering

Sir FREDERIC NATHAN gave some particulars of the arrangements which are being made with a view to holding an international congress on chemical engineering. A small committee had been formed to consider the matter from all points of view, and had asked him to get into touch with the chairman of the World Power Congress in order to enlist the support of that organisation. The chairman of the World Power Congress had been very enthusiastic and had promised the support of his organisation in every possible way. The position reached was that the Institution of Chemical Engineers and the World Power Congress had appointed representatives, who were actively engaged in considering the scheme in detail. It was anticipated that an international congress on chemical engineering would be held in 1934. It was hoped that this would do a great deal to further the science and the profession of chemical engineering in this country.

The PRESIDENT then delivered his address, which is reported on page 181.

Thermal Insulation

After luncheon, a paper was presented by Dr. Ezer Griffiths, F.R.S., of the Physics Department of the National Physical Laboratory, in which he dealt with methods of testing heat insulating materials. Many examples of insulating materials were exhibited. For low-temperature tests, *i.e.*, from 0° C. up to about 100° C. an electrically heated plate apparatus was used, the specimens being sandwiched between a central hot plate and guard ring and two cold plates. Materials employed in the insulation of refrigerating plants were studied by this apparatus, such materials being cork, in slab and granulated form, and slag wool; it had also been used for the testing of wall boards, cellular expanded rubber and Balsa wood. Slab cork was obtainable with a thermal conductivity as low as 0.00007 C.G.S. units, which figure might be compared with that of still air, *i.e.*, about 0.00006 C.G.S. units. As regards slab cork, he said that, given high-grade raw material, the material of lowest density had the highest insulating value.

Of the materials used for insulation at ordinary atmospheric temperatures, he mentioned breeze and clinker concretes, pumice concretes and aerated concretes. Pumice and aerated concretes were the more generally used materials when thermal insulation was required. Pumice concrete was believed to be immune from the type of failure associated with breeze and clinker concretes, where unsound material led to progressive expansion. In testing wall materials, a test slab 3 ft. by 3 ft. was used, as the linear dimensions must be large compared with the thickness. Dwelling-houses had been constructed using precast slabs of cork board and coke breeze inserted between vertical stanchions and then cemented over on both faces.

Refractory bricks and materials used in furnace construction were tested at various temperatures of the hot face up to 1,100° C. In this apparatus the heating was effected by a number of "silit" rods contained in a shallow box with a nichrome plate lid. The test specimen was in contact with this plate, whilst in contact with the other face of the specimen was a water flow calorimeter fitted with guard ring.

The heat transmitted through the speciment was determined from the rate of flow and temperature rise of the water. The materials studied with this apparatus included bricks and powder of diatomaceous earth. This material, when purified, was composed largely of silica shells and its property as a thermal insulator was due to the minute air cells enclosed by the silica walls. Bricks were made of this material to suit particular requirements; for example, bricks for furnace and kiln bases, which demanded a high crushing strength; in this case a compromise had to be effected between a low thermal conductivity and high mechanical strength.

Dr. Griffiths also mentioned an investigation which had been conducted into the loss of heat at various temperatures from the external surface of a hot pipe in air. A 4-in. steam barrel, 20-ft. in length, was heated to various steady temperatures by means of a ½ in. diameter rod of graphite supported at points along the axis of the pipe, the rod was heated by a current of the order of 200 amps., and pipe surface temperatures up to 600° F. were attained. For testing the hardness or softness of insulating materials, such as cork, as used for cold storage chamber construction, he mentioned an indentation test by which a 3 in. diameter steel ball was used, the depression made by the ball at various applied loads being measured.

Points from the Discussion

Dr. W. R. Ormandy said there was a general feeling among the population of this country that Government and semi-Government departments existed primarily to use up our income tax; that, however, was quite a mistake. His own experience with the Board of Trade, the Fuel Research Board of the Department of Scientific and Industrial Research, and other Government departments generally was that they were willing and anxious to give all the help they could to industry, and their chief objection was that industrialists did not make so much use of them as they could do. To show that useful information could be obtained by means of quite simple apparatus, he recalled that not long ago he was asked to examine the thermal properties of a very finely divided silica powder. The apparatus he had employed, with the exception of the thermo-couple and potentiometer, had cost 1s. or 1s. 2d. It had consisted of a polished brass tube 3½ c.m. in diameter and 6 in. long, with a slab of cork at the bottom, and a 3½ mm. copper steam pipe running through the centre. The insulating material was packed between the steam pipe and the outer copper vessel, and the thermo-couple was attached to the centre of the inner surface of the outer copper vessel. It was found that the insulating capacity of this finely-divided silica was 2 per cent. better than that of basic magnesium carbonate. The results of experiments carried out at the National Physical Laboratory had shown that the finely divided silica had an insulating capacity 2.3 per cent. better, so that it was proved that with simple apparatus one could obtain comparatively good results. He had also carried out experiments as to the temperature drop when the copper tube was coated with different materials. The rate of the temperature drop when the tube was coated with aluminium paint was 3, and when covered with white enamel it was 12. It would seem, therefore, that there was quite a deal of importance to be attached to the nature of the paint applied to the outside of canvas coverings.

Mr. E. C. Evans (National Federation of Iron and Steel Manufacturers), emphasising the importance of the problem of heat insulation to the iron and steel industry, said that in open hearth practice they were dealing with furnaces in which about 10 per cent. of useful heat went to the metal and 90 per cent. was used to meet radiation and external cooling losses. The temperatures used in such practice were rising up to 1,6000 and 1,700° C., and whilst diatomaceous earths or diatomaceous bases had been used they had not proved altogether satisfactory, partly owing to the liability to air infiltration—which meant that the furnaces had to be painted over—and partly because the bricks became converted in the course of time into powder and became more and more compact, leaving quite a considerable space free from any insulating material whatever.

The Deciding Factor

Dr. A. J. V. Underwood pointed out that from the industrial point of view the deciding factor very often was not alone the thermal conductivity of the material to be used, but the combination of that factor and the cost of the material, so that one had to compromise sometimes. One might find in practice that a material which was not so efficient an insulator as another, but which cost less, would prove to be the more economical insulating medium. If using the more expensive insulating materials the saving resulting from the reduction of heat loss might be more than offset by the higher cost of the insulating material. If we could get some sort of combined criterion of thermal insulation and cost, it might be more instructive than some of the figures relating to thermal insulation properties only.

Dr. Griffiths, replying to the discussion, dealt with Dr. Underwood's remarks concerning efficiency in combination with cost, and said he had looked into that in connection with cork, and had drawn a series of curves, assuming certain costs for power, certain depreciation losses on the material, and capital charges. One could work out with a reasonable degree of accuracy the most economical thickness to employ on any given job. Replying to a question concerning silit rods, he said that they did " evaporate "—he believed that was the term to use—in course of time, but after many years' experience he had found them to be very useful. If one wished to maintain a face measuring, say, 14 in. by 10 in., at a uniform temperature of 1,100° C., the silit rod type of heater was quite convenient. There was a series of rods running in parallel, and even if one rod broke down it did not necessitate stopping the test. The uniformity of temperature was excellent owing to the large radiation transfer. With regard to the question of the temperature coefficient of the thermal conductivity, he said one obtained values between 0.1 per cent. and 0.2 per cent., but it certainly depended to a considerable extent on the sizes of the pores and also the actual material. He hoped to be able to consider more fully in the near future the theoretical basis of temperature coefficient.

Speeches at the Annual Dinner

Sir Harry McGowan on the Dawn of Prosperity

Mr. W. A. S. Calder presided over a company of some 250 members, ladies and guests, at the annual dinner, the principal guest being Sir Harry McGowan (chairman of Imperial Chemical Industries, Ltd.) Among those present were Viscount Leverhulme (president-elect), Sir John Cadman, Dr. H. J. Bush, Dr. G. C. Clayton, Sir William Butler, Lieut.-Col. Hatchard-Smith, Dr. H. Levinstein, Professor G. T. Morgan, Sir Frederic Nathan, Sir Joseph Petavel, Professor J. C. Philip, Mr. H. J. Pooley, Dr. R. Lessing, Professor W. E. Gibbs, Dr. J. T. Dunn, Professor J. C. Drummond, Professor H. E. Armstrong, Dr. E. F. Armstrong, Dr. W. Cullen, Mr. H. Talbot, Mr. C. S. Garland, Sir Alexander Gibb, Mr. W. Macnab, Dr. W. R. Ormandy, Mr. J. Davidson Pratt, Mr. J. Arthur Reavell, Sir Robert Robertson, Mr. F. H. Robers, Mr. J. F. Ronca, Dr. R. Seligman, Dr. F. S. Sinnatt, Dr. E. W. Smith, Mr. H. T. Tizard, and Dr. A. J. V. Underwood.

Sir Harry McGowan, proposing "The Institution of Chemical Engineers," said that there were few activities which did not call for the services of the chemical engineer and there was no excuse nowadays to ask " What is a chemical engineer?" Up to the present, the road of the chemical engineer had been no easy one. He had been regarded somewhat dubiously by both engineer and chemist. He was sometimes too " molecular " for the engineer and rather " mundane " for the chemist. By virtue of his well-known tact, however, he would no doubt quickly surmount these difficulties so that the engineer would fully appreciate and even proclaim his virtues, whilst the champions of pure chemistry might perhaps become reconciled to his taint of worldliness. The past year had been one which few could contemplate with satisfaction but important developments had been taking place during the past few months. In September last, when we went off the gold standard—in his opinion much too late—the position was much more serious than the man in the street knew, but we all hoped and believed that by the change in our fiscal arrangements a new era of prosperity had opened for our country. Too long had we looked after the interests of the foreigner and it was time we looked after ourselves. If, however, the new duties resulted in an immediate increase in the cost of living that would bring with it an immediate

demand for higher wages; then we should be just where we were months ago. It was therefore with some satisfaction that he saw the moderation with which the Government had attacked the problem.

The New Tariffs

The new tariff was called a revenue tariff but whilst it was very nice to collect revenue from imported goods we wanted these goods made in this country. He felt very strongly that the dawn was breaking. The company of which he had the honour to be chairman might be looked upon as a barometer in regard to certain heavy industries, and he was pleased to say that their sales of heavy chemicals for the first six weeks of this year showed advances varying from 10 to 20 per cent. over the corresponding period of last year. We now had a chance in a lifetime and if international affairs were settled, including reparations for war damage, then he saw nothing but steady progress for the old country. A great work was awaiting the chemical engineer and we must see to it that this work was brought to fruition, in the accomplishment of which the trained chemical engineer was bound to play a prominent part.

The PRESIDENT, replying to the toast, said the ambition of the Institution was to gain experience and retain its youthful ideals and resolutions. The continually widening field open to the chemical engineer in the discovery of new materials for plant construction, and the selection of the most suitable materials for any special purpose and the necessary modifications of plant design furnished sufficient scope to justify the chemical engineer.

Lord LEVERHULME proposed the toast of "Our Guests."

Sir JOHN CADMAN, who made the first response, expressed his conviction that the combination of chemistry and engineering in the chemical engineer was a most important link in the development of the great industries of the country and it would add to the capacity of this country to carry out its functions as a great industrial nation.

Mr. J. ARTHUR REAVELL, proposing the toast of "The President," spoke of the valuable work he had done for the chemical engineering profession and of the human touch he had brought into it and suggested that a valuable use might be made of all past presidents of such institutions. The politicians had made a pretty bad mess of things and left the country in a hole and he therefore put forward the proposition that nobody should be allowed to become a member of Parliament until he had been the president of some institution such as the Institution of Chemical Engineers.

The PRESIDENT, responding, said he could not have carried on the work of the Institution but for the generous help given to him by the members of Council, whilst there had also been exhibited a most wonderful spirit of helpfulness on the part of the past president. In addition to that, there was the efficient work of Mr. Mackie, the assistant secretary, and the office staff.

Uniformity in Industrial Fuels

The Determination of Reactivity for Coals and Cokes

THE maintenance of uniformity in industrial fuels was the subject of a paper read before the North Western Section of the Institute of Fuel, on February 10, when Mr. A. McCulloch presided. The author of this paper, Dr. A. C. Dunningham, said that the method now adopted for the determination of reactivity of coals was a modification of that used by the Northern Coke Research Committee, and consisted in burning a column of fuel under standard conditions, and with a carefully controlled air supply, and noting not only the temperature of combustion but also the ratio of CO to CO_2 in the products of combustion. The test was necessarily empirical, for comparative results were entirely dependent on the maintenance of arbitrarily fixed conditions. Results so far obtained gave certain very definite indications of the behaviour of a fuel when burned in a large-scale plant and might be expected to yield information of considerable technical value.

In determining the suitability of a coal for the particular process under consideration, the two questions which arose were (1) would the coal give a sufficiently high temperature to produce a certain technical effect? (2) What was the fuel consumption required to produce this effect? By large-scale experimental trials, a number of coals had been evaluated from both these standpoints. Usually, those coals which gave a high temperature, and hence a good technical result, also required relatively low fuel consumption. On the other hand, those giving a lower temperature and hence an inferior technical result, also necessitated a higher fuel consumption. Occasional exceptions, however, had been noted in which this correspondence did not hold. In one particular case, high temperature, as indicated by a good technical result, was definitely accompanied by high fuel consumption.

Temperature and CO Formation

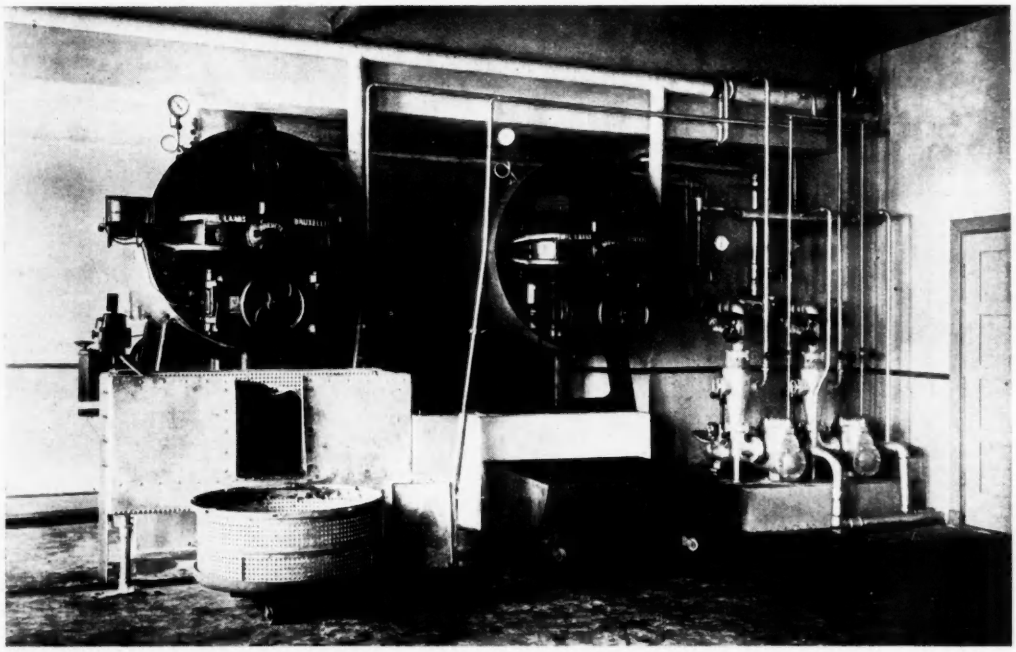
The results of reactivity tests carried out on these coals had corresponded closely to those obtained on the large-scale trials. It had been found that higher burning temperatures were accompanied by lower reactivities as indicated by relatively low CO formation. Lower burning temperatures, on the other hand, corresponded to relatively high CO formation. The particular exception noted above gave a high burning temperature together with a high CO formation. From this result it might be predicted that this coal would give a good technical result together with a high fuel consumption. This was actually the case in practice, and it would thus appear that the behaviour of a fuel, at least in this particular process, could be foretold with some accuracy by means of the reactivity test.

In pulverised fuel furnaces, a high reactivity should correspond to rapid burning and high CO formation at the surface of the particle. This should lead to a greater rate of liberation of heat per unit of space under similar conditions. Not only was combustion more rapid owing to the greater formation of CO, but less oxygen was required to reach the particle in order to bring about complete gasification. Hence, if the rate of diffusion of oxygen to the particle was a factor limiting the rate of combustion, it would seem to follow that a highly reactive particle would gasify more rapidly owing to the fact that it required less oxygen in immediate contact with it. The subsequent combustion of CO to CO_2 would take place as the former gas diffused away from the particle. He was aware, Dr. Dunningham stated, that this subject was a very complex one, and was at the present time the subject of considerable discussion, some authorities holding that the rate of combustion of a particle was primarily dependent upon an inherent property of the carbon itself, and others that the rate of diffusion of oxygen to the particle was the primary factor. The theory advanced above, however, appeared to suggest that both factors might be of importance and to some extent interdependent upon one another.

Reactivity of Coke

The results obtained seemed likely to throw further light on the question of the reactivity of coke, upon which so much fruitful work had been done by the Northern and Midland Coke Research Associations. The majority of tests so far made had been carried out on coals of poor coking properties, but a limited number had been made upon good coking coals and a comparison had been made between the reactivities of these and of high temperature cokes made from them. No attempt had been made to coke the particular samples of coals used. The comparisons had been made between commercial cokes and coals from the seams known to be used in their manufacture. Before the actual determination of reactivity, all coals were coked at 400 to 420° C. to 800° C. until the evolution of volatile matter ceased, and then raised to expel further volatile matter. Thus the conditions were entirely different from those used industrially and the physical character of the coke so produced was entirely different. Yet it had been found that the reactivity as indicated both by temperature of burning and formation of CO was very similar in both cases. This would seem to confirm the view that reactivity was inherent in the original coal and that other factors such as conditions of coking were of secondary importance. It would seem indeed that there had merely been success in divorcing reactivity from physical properties such as the "shatter" index.

"IWEL-LAABS" DRY RENDERING PLANT AT THE NEW ABATTOIR OF THE LONDON CO-OPERATIVE SOCIETY.



A SIMILAR "IWEL-LAABS" INSTALLATION AT WINTERSWIJK, HOLLAND.

These illustrations, reproduced by courtesy of Industrial Waste Eliminators Ltd., London, show typical plant by means of which slaughter-house waste and condemned meat is now usefully converted into cattle feeding stuffs and fertilisers, with the recovery of fats for ultimate use in the manufacture of soap and candles. The wastes are first broken down and dried under pressure in the melter to be seen to the right in the upper illustration; they are then passed to the turbine centrifugal extractors seen to the left, where the residual fats are removed and recovered by treatment with high pressure steam.

Dry Rendering as applied to Abattoir Waste and Condemned Meat

Delivery Dates: The Importance of Punctuality

By J. H. West, M.I.Chem.E.

British chemical plant manufacturers are preparing for a revival in trade as a consequence of the establishment of a number of new factories by foreign firms in this country and the operation of the proposed new tariffs. In regard to quality and workmanship of their products, they have nothing to fear, and on the whole their service is good, but in some directions there is a tendency to slackness as to delivery dates. In the following article, Mr. West, who has had considerable dealings with the manufacturers, stresses the need of increased attention to this important factor in industry.

SEVERAL foreign firms are establishing branch factories in this country, and more will no doubt follow their example as the tariff policy is developed and expanded. British plant manufacturers are keenly awaiting opportunities of supplying equipment for these factories, and no less keenly are they awaiting the revival in trade which will enable our own factories to modernise and extend their plant. During the waiting period it is worth while considering the importance of keeping promises regarding dates of delivery as a factor in having well satisfied clients who will without hesitation come back for more when occasion offers. Unfortunately some British manufacturers do not realise how much harm late deliveries do to their business. Generally speaking, British plant manufacturers as regards workmanship and design, performance, quality of materials used are well ahead of their foreign competitors. As regards price they are often unable to compete on level terms, owing to factors which are mainly beyond their control, but these handicaps will be greatly lessened by tariffs.

The question of dependable deliveries is, however, entirely in the hands of the British manufacturer, and the object of these notes is to stress the importance of this matter from the purchaser's point of view. If some of the plant manufacturers will express their point of view, and make their difficulties clear to the purchaser, it will be all to the good.

Why is late delivery so serious? What is all the hurry about? This question is best answered by asking another. Why does a commodity manufacturer order a new plant or decide to build a new factory? It is because he expects to make a profit by so doing. That profit will be, say, £*x* per day, and therefore every extra day that elapses before the plant or the factory gets into operation means a dead loss of £*x* to him. Or perhaps a plant or a piece of apparatus is ordered to replace some existing material which has broken down or worn out or become obsolete. Again every day's delay in getting it to work represents a definite and usually quite ascertainable loss.

Increasing the Expense

In the case of large plants or complete factories, the seriousness of late delivery of one item may be much greater in proportion, for it may throw the whole programme of erection behind, and keep whole squads of men idle, or, what is nearly as bad, necessitate men being switched on to other jobs and then brought back again which always means more expense, and often bad work.

During the last few years the writer was responsible for getting a large factory built and equipped, and the most difficult thing was trying to get delivery of material to time. For most of the period, practically the whole time of two men and two typists had to be devoted to chasing up overdue material, and it became necessary to take on in addition a special man to devote his whole time to going round plant manufacturers' works to find out on the spot what the position of orders was, and to insist upon steps being taken to hasten delivery, after letters, telegrams and telephone calls without number had failed to produce any effect. This applies, of course, not only to chemical plant but also to equipment of all sorts, building materials, steam and power plant, permanent way material and so on.

At the beginning of the job it was decided to standardise one maker for one class of appliance and one for another class respectively, in order to facilitate the keeping of spare parts and renewals. In both these cases the deliveries were so bad, and it became so evident that these particular makers were either unwilling or unable to do any better, that their names were struck off the list—representing a loss of business to them of many thousands of pounds. There was nothing wrong with the goods, but it was impossible to wait eight, nine or more weeks for deliveries definitely promised in five or six weeks. There were at least five or six other firms to whom inquiries were no longer sent after they had failed several times to keep their promises.

The Danger of Taking Chances

The placing of an order very often depends upon time of delivery. There may be little to choose between quotations. Perhaps one price is ten per cent. higher, but the delivery time is, say, six weeks against eight weeks. The purchaser probably asks the lower tenderers whether they cannot reduce their time of delivery, and there is a strong temptation to agree in order to book the order. A chance is taken without any real prospect of the reduced time being adhered to. On the other hand, the purchaser may decide to pay the extra 10 per cent. in order to save the two weeks, and may then be let down and not get his goods in less than eight weeks. The date of delivery, from the purchaser's point of view, means the date of arrival of the goods at his works, and not the date on which they leave the plant makers' works. Many firms appear to think that once they have handled the material over to the railway company their responsibility ends. This is not the way of good post-sales service. They should be careful to advise the purchaser in good time of the company and route by which the goods have been sent and especially of the wagon number, so that, if the goods go astray, as they often do, no time may be lost in taking the matter up with the railway.

Careful and clear labelling of packages is also essential. In the case of the factory referred to, a system of reference letters and numbers was adopted under which the supplier was instructed on the official order sent to him to mark each package clearly with a letter and number which indicated to the storekeeper at the factory site not only which building the goods were intended for, but also the particular item of plant. The same annotation was used throughout on all drawings and lists of material so that the work of getting the goods to the exact spot where they were wanted and the task of the erecting engineers was facilitated enormously. Yet there were firms who would not take the trouble to carry out these simple instructions, and endless trouble ensued. In many cases the advice notes did not arrive until several days after the goods.

The Cause of Late Deliveries

If all plant manufacturers would impress upon their staffs, as many of them do, the necessity of looking at these little points of after-sales service from the purchasers' point of view, they would greatly increase the goodwill of their business and their chance of repeat orders.

Of the causes of late deliveries, probably delays in obtaining materials from other manufacturers are the most common. Sheets, tubes and fittings cannot be kept in stock by plant manufacturers to meet any and every requirement, and they in turn are let down by their suppliers who fail to keep their promises. Faulty castings, the defects in which only appear during the course of machining, are another fairly frequent cause, but there are probably many cases where inefficient progressing of the work going through the shops is to blame. It is by no means easy in shop management to have enough elasticity in the system to be able to catch up with orders which have fallen behind the schedule without adding to costs. Prices are cut very fine these days, and shop managers naturally do not like working overtime without an increase in the selling price, but surely it is worth while to forego a part of the profit in order to have a satisfied client who knows that he can depend upon that particular firm to come up to time.

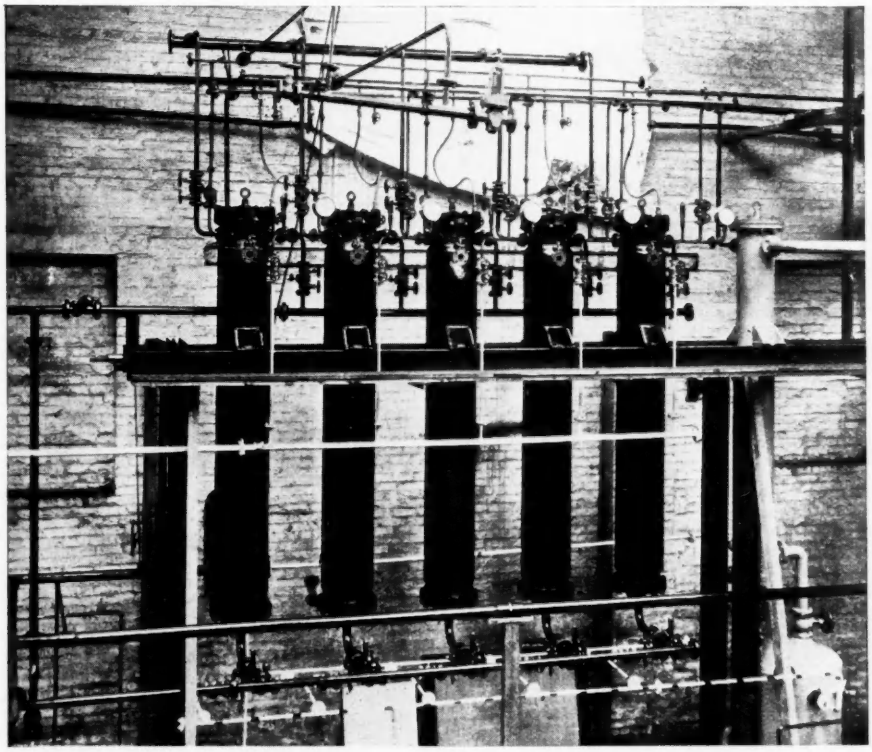
The purchaser on his side should give the plant manufacturers as much time as he can, and should never demand quick delivery where this is not essential. He should above all things avoid making changes in the drawings or specifications after the order is placed, and he should lose no time in approving the working drawings submitted by the supplier.

Nickel as a Catalyst in Chemical Reactions

By M. Paul Sabatier

M. Paul Sabatier was for some time the assistant of Berthelot at the Collège de France, and since 1882 has been Professor of the Faculté des Sciences in Toulouse, occupying the position of Senior Professor for the past 26 years. His discovery of the method of hydrogenation by finely-divided metals won for him the 1912 Nobel Prize for Chemistry. This article appeared in the "Revue du Nickel," January, 1932, the present translation being reprinted from the current issue of "The Nickel Bulletin."

For many years the activity of nickel in chemical reactions was not given much attention. It has only a fair affinity for oxygen, lower than that of cobalt, iron, zinc and manganese and even more inferior to that of magnesium and calcium. About 40 years ago, however, the specific character of this activity manifested itself by the direct combination of the metal with carbon monoxide, resulting in the formation of a well-defined volatile compound—nickel carbonyl. Iron forms a similar compound, although less readily, while carbonyls have since been obtained also from cobalt and molybdenum. This fixation on a metal of a gaseous molecule with free valences, such as carbon monoxide, naturally incited chemists to try and produce similar compounds from other incomplete gaseous molecules, such as nitrous oxide, nitric oxide, nitrogen peroxide, acetylene and ethylene.



A typical Hydrogenation Plant in operation in India for the Production of Vegetable Ghee using Nickel as Catalyst.
(Reproduced by courtesy of Technical Research Works, Ltd.)

In the course of the work which I carried out on this subject with M. Senderens in 1894, by using finely divided metals obtained by the reduction of their oxides, we were able to obtain from nitrous oxide and nitric oxide only a slight oxidation of the metal with liberation of nitrogen. Nitrogen peroxide, however, directed as a gas on to reduced nickel, gives a bright incandescence which leads to the formation of black oxide. If, on the other hand, its vapour is diluted with an excess of nitrogen, a regular fixation will be observed which may amount to a quarter of a molecule of NO_2 per atom of nickel, and a solid black unstable product, ***nickel nitrate,*** is formed, similar to the metal nitrates derived from cobalt, iron, and especially copper, under the same conditions.

A little later, in 1896, Moissan and Moureu experimented with acetylene. This gas, directed on to nickel, cobalt or iron, freshly reduced from their oxides and cooled to ordinary temperature, gives rise to an immediate incandescence, resulting in the total decomposition of the acetylene. The two scientists attributed the cause of this to the heat released by physical condensation in the pores of the reduced metal, it being presumed that the heat produced by the breaking down of the acetylene, an endothermic compound, into its elements carbon and hydrogen, sufficed to sustain the incandescence and maintain the reaction.

In 1897, M. Senderens and I obtained a similar phenomena of destructive incandescence by means of ethylene in reaction with nickel heated to 300° C. The ethylene is decomposed, giving a finely divided black carbide in which the metal is diffused in extremely fine particles. The gas given off, however, consists not of hydrogen, more or less contaminated with products arising from irregular heating, but mainly of ethane, and we concluded from this that the nickel, having broken up part of the ethylene, had utilised the hydrogen formed to hydrogenate the rest of the ethylene. Iron and cobalt behave in a similar manner, but give a lower proportion of ethane. The phenomenon is most striking with nickel, thus revealing the catalytic properties of this metal.

In effect, a mixture of equal volumes of ethylene (C_2H_4) and hydrogen, acting on reduced nickel at about 40° C., will change into ethane (C_2H_6) with evolution of heat, and the reaction will proceed indefinitely, *without the nickel itself changing in any way.* At 180° C. the reaction is identical in character but much more rapid, and permits of the entire

transformation of a rapid current of the gaseous mixture. We have proved that the same reactions take place with all ethylene carbides, which are changed entirely into methane carbides.

We consider that this effect is due to the formation, on the surface of each grain of reduced nickel, by direct combination with hydrogen, of a hydride such as NiH_2, an unstable hydride, capable of rapidly decomposing into atomic hydrogen, and of thus producing, on the various molecules with which it comes into contact, direct hydrogenation which molecular hydrogenation would be unable to produce, or would produce only very slowly. As the regenerated metal is able to combine with hydrogen afresh, the same processes are reproduced indefinitely.

Catalytic Activity of Nickel

With M. Senderens, and afterwards with MM. Mailhe, Murat, Espil and others, I set out to develop the applications of this hydrogenation capacity. With very few exceptions, all the gaseous molecules capable of combining with hydrogen by addition, or of reacting with it by reduction, reacted more or less quickly, and without any appreciable disturbance, at temperatures not exceeding 180° C., in the presence of hydrogen and nickel recently reducd from its oxide, and with liquid substances the same is true, provided that the pulverulent nickel, the reducible matter and the hydrogen are maintained in intimate contact by adequate agitation

The catalytic activity of the metal continues indefinitely provided there is no trace, either in the material treated or in the hydrogen. of poisonous substances capable of chemically changing the surface of the particles of nickel. Compounds of chlorine, bromide iodine and sulphur have a somewhat serious effect, since the chloride, bromide, iodide and sulphide of nickel formed on the surface of the metal are not reducible by hydrogen at the low temperature of operation. Traces of oxygen or air, on the contrary, are without any harmful effect, the nickel oxide being reduced at 186° C. It should be added that in most cases deterioration of the nickel can be prevented or diminished by insertion, prior to the use of the nickel catalyst, of a reduced copper catalyst (heated to about 250° C.) capable of arresting most of the harmful impurities.

Direct hydrogenation of organic matter by hydrogen in the presence of nickel has advantageously replaced the old methods, such as sodium or sodium amalgam in contact with water or alcohol, and zinc or iron in contact with dilute acids Examples which may be given are the transformation of aldehydes into primary alcohols of acetones into secondary alcohols, which take place without any parasitic formation, and also the production of amines from derived nitrates, amides, oximes and nitrites. An even more striking example is presented by the saturation of double ethylene compounds, which takes place on a nickel catalyst with extraordinary ease.

Hydrogenation of the Aromatic Nucleus

The most successful application of the nickel catalyst, however, is in the direct hydrogenation of the aromatic nucleus and of the more complex nucleui of naphthalene, anthracene, etc., a process in comparison with which the old methods are practically worthless. The universal method of hydrogenation by heating in a sealed tube with a concentrated solution of hydriodic acid, a very powerful method, but difficult and dangerous to apply practically, gives only a misleading result with benzene, the hexagonal cycle passing to the pentagonal nucleus. On the contrary, the nickel method applied to benzene and to various aromatic compounds, carbides, phenols, amines, ethers and oxides, changes them easily into cyclohexane and derivatives of cyclohexane, and the preparation of these latter compounds, which was formerly attended with many difficulties, has now become a very simple industrial operation. Reference may also be made to the transformation of carbon monoxide or carbon dioxide into methane. a reaction which can easily be industrialised and which provides the means for replacing water gas of low calorific power by a gas of high calorific power.

The transformation of oils into solid fats by direct hydrogenation in contact with a nickel catalyst is currently in operation in a large number of works, the pulverulent metal being immersed in oil at about 180° C. and violently agitated with hydrogen. Experience has shown the advisability of adding to the nickel a certain amount of copper, which appears to activate it in some way.

Hydrogenation of acetylene by means of an equal volume of hydrogen is very easily produced by nickel at and above ordinary temperatures, and the ethylene thus formed may serve as the basis of the synthetic manufacture of ethyl alcohol.

Derivation of Catalytic Effects

If the power of nickel as a catalyst is derived, as has been stated above, from the temporary formation of a hydride produced by the direct action of gaseous hydrogen, this same unstable hydride might undoubtedly be formed, under certain conditions, from substances rich in hydrogen, which will thus be dehydrogenated. Finely divided nickel may therefore be presumed to act as a dehydrogenation catalyst, and this activity has been proved by experience in a large number of cases. In the presence of nickel, at fairly low temperatures, the primary alcohols are resolved into hydrogen and aldehydes, and the secondary alcohols into hydrogen and acetones; the hydrocyclic carbides return to the original cycle. In the same way cyclohexane regenerates benzene; limonene furnishes cymene; piperidine returns to pyridine.

Variations of pressure may play an important part in these different catalytic reactions; hydrogenations consisting of a condensation and diminution of the number of folecules are greatly facilitated and accelerated by high pressures, while dehydrogenations are assisted by a lowering of the pressure.

Another catalytic effect of finely divided nickel arises from its special affinity for carbon monoxide and from the instability of nickel carbonyl, which is formed by their combination. With M. Senderens, I have shown that from temperatures of 230° C. carbon monoxide is broken down by nickel into carbon and carbon dioxide, at first only partially, then completely at temperatures above 250° C., the nickel remaining diffused in the carbon powder which is deposited; consequently the gases produced by the action of nickel on water gas above this temperature cannot possibly contain the smallest amount of carbon monoxide.

Cobalt, iron and even copper possess similar catalytic properties of hydrogenation and dehydrogenation, but in these metals the properties are less regular and less active. The superiority of nickel as a catalyst is indisputable, and provided that poisons capable of altering the surface of the grains of metal are carefully removed from the hydrogen or materials upon which it acts, the life of the nickel catalyst is almost indefinite, for all operations carried out at temperatures in the region of 180° C.

National Federation of Iron and Steel Manufacturers

Planning for the Future

THE annual dinner of the National Federation of Iron and Steel Manufacturers was held at the Hotel Victoria, London, on February 18, when Mr. A. J. Grant, the president, was in the chair. Mr. Hore-Belisha, Parliamentary Secretary to the Board of Trade, was unable to be present. In a letter of apology he expressed the hope that the policy the Government had now announced would open a new era of prosperity for the iron and steel industry.

Proposing the toast of "His Majesty's Government and the House of Commons," Mr. James Henderson, a vice-president of the Federation, said that immediate and effective action was imperative if the iron and steel industry was to survive. What was needed was what the Government was trying to achieve, a reduction of taxation and the creation of conditions in which the industry could freely develop.

Sir William Clare Lees, M.P., president of the Association of British Chambers of Commerce, proposing "The Iron and Steel Industry," said that world conditions had brought the demand for capital goods almost to a standstill. When that phase passed British iron and steel products would be found to be more competitive in price than they had been for a number of years. He was glad to know that there were plans for a large plant to produce the cheaper qualities of steel where suitable ore was available, when the economic situation justified the capital expenditure.

The President, in reply, said that iron and steel manufacturers welcomed the dawn of a new era with a Government pledged to a national industrial policy.

Investigation of Atmospheric Pollution

Unusually Pure Air at Coventry

Estimates of the amount of tar, soot and other impurities deposited from the air during the twelve months ended March 31, 1931, at 98 observing stations situated in 42 important towns and cities in Great Britain, and estimates of the amount of impurities suspended in the atmosphere at observing stations in London, Glasgow and three other towns, are contained in the seventeenth Report on Atmospheric Pollution issued by the Department of Scientific and Industrial Research (H.M. Stationery Office, 5s. 6d. net), which is summarised below.

IN industrial districts the amount of solid matter deposited or brought down by rain varied from 550 tons per square mile at one point in Lancashire to just over 72 tons at Western Park, Leicester. The average deposit recorded is between 200 and 300 tons per square mile. At about two-thirds of the observing stations a reduction in the total amount of impurity deposited is recorded. The most remarkable improvement is shown in the deposit of sulphates, 35 stations having a reduction of deposit. This result is the more satisfactory as it is well known that sulphur in the atmosphere plays a considerable part in the damage done to buildings by smoke which in the case of Government buildings alone, Sir Frank Baines once assessed at £120,000 per annum.

The general improvement, however, does not apply to certain London districts. At Ravenscourt Park, W., for example, the increase in sulphur deposit has been excessive, amounting to nearly three times the previous average. At Golden Lane near Finsbury Circus the tar deposit has increased nearly 3½ times. No definite explanations are given in the Report for these increases.

Effect of London Fogs

As regards impurity suspended in the atmosphere, it seems probable that London may have to put up with black fogs for many years to come. According to the Report, "sufficient smoke is emitted in London during two or three hours of a winter's morning to produce the blackest fog of which we have any experience, provided that it fails to be carried away, and given that the atmospheric conditions are suitable for this accumulation. A reduction in the rate of smoke emission by one-third would probably appear simply as a delay in the formation of the fog, *i.e.*, if under previous conditions the smoke density in the fog attained its maximum in two hours, under the new conditions it would take three hours. Looking at this matter in another way, it does not appear from the deposit records that there has been any material reduction in pollution during the last ten years, hence it is difficult to account for the general optimistic belief in the reduction of smoke fogs." One remarkable fact about London's atmosphere is the extent to which thick smoke haze appears to be local. The neighbourhood of Charing Cross would seem to be one of the smokiest spots in London. During the winter months of 1930-31 a thickish smoke haze was recorded by an automatic recorder at the Westminster City Hall on 135 days, while at Westminster Bridge an instrument recorded a similar haziness on 79 days, one at Victoria Street on 63 days, and one at South Kensington on 58 days. At Kew Observatory, on the other hand, only 19 hazy days were recorded. A smoky fog in London appears likely to be at its maximum at 10 a.m., but the smoke haze thickens again between 7 p.m. and 8 p.m. The amount of smoke haze in London is apparently far worse than in many industrial centres. In the same months the Glasgow stations recorded on the average 30 hazy days, while Blackburn had 13 days and Stoke-on-Trent 10.

Causes of Pure Atmosphere

The most remarkable records come from Coventry, which had not one single day in the period under review on which smoke haze was recorded. The atmosphere at Coventry may therefore be taken as unusually pure for a city of that size. The Report quotes the views of the Medical Officer of Health as to the possible causes of this condition as follows:—

"I doubt if any manufacturing town approximating to the size of Coventry can lay claim to a purer atmosphere; and I suggest several reasons for this, viz.:—(1) There are no adjoining industrial towns to add pollution—the city is surrounded by open country, no part of which has an altitude sufficient to cause interference with the scavenging action of the wind. (2) Some of our largest factories are situated on the outskirts of the city in semi-rural surrounds. (3) Our sources of smoke production are unusually limited for a manufacturing town of this size; electricity is very cheap here and all large factories use it for power purposes, and gas, which also is cheap, has to a great extent superseded solid fuel in the treatment of metals. (4) We find it unnecessary to employ a special smoke inspector. (5) The prevalence of the use of gas stoves and gas fires for cooking and heating is another contributory factor in the minimising of the smoke from dwelling-houses; I am informed by our Gas Department that there are over 41,000 gas cookers and 14,500 gas fires installed at the present time, and that during the coal stoppage some years ago only 98 persons applied for coal permits on the ground that they had no gas stoves. (6) The comparative population density is low, viz., 13.4 per acres."

Spread of Pollution

In previous reports on atmospheric pollution it has been pointed out that no reliable information exists regarding the extent to which pollution in a particular town may be partly due to impurities carried from neighbouring towns. The present report records the completion of an experiment to obtain definite data as to the distance to which pollution can be carried by wind from an urban area. Norwich was selected as the site of the investigation, because of its isolation from other industrial areas, and because of the number of roads radiating from it in different directions. The results show that the pollution decreases inversely as the distance of the city and was measurable with the apparatus used at a distance of 5-6 miles down wind from the centre of the city. Norwich is about two miles in diameter and assuming the same conditions the report suggests that pollution from a town or a group of towns 24 miles in diameter would be perceptible at a distance of between 60 and 70 miles. This distance would be greater or less according to whether the air was polluted more or less than that of Norwich whose air was, in fact, found to be relatively very clean.

The Report records that during the year the development of a simple method for the routine determination of sulphur in the atmosphere has been completed and a description of it issued to co-operating local authorities. The National Physical Laboratory has also completed its work on an instrument for the measurement of daylight which is now being tested by the Atmospheric Pollution Research Committee. The National Physical Laboratory is also carrying out work on the amount of water in fog as opposed to smoke particles. An attempt is also being made to devise means for distinguishing grits emitted by different types of furnaces from one another.

Problems of a New Factory

A Book about Welwyn

IN view of the interest now being taken in the establishment of new factories in England, both by foreign and home manufacturers, the Welwyn Garden City Information Bureau has issued a new publication, "Factories in England," setting out briefly the chief points that arise in establishing manufacturing plant in Great Britain and advancing the claims of Welwyn as a favourable centre. Welwyn already comprises amongst its industries the manufacture of waterproofing compounds, cellulose enamelling, steelwork, matches, soap, oils, metal work, concrete aggregates and tile manufacture, and the book shows how well England's second Garden City is adapted for further industrial development.

At Welwyn there is an organisation equipped to advise on all questions relating to the factory. If a manufacturer has his own architect, the services of the company's organisation are at his disposal on any local aspect of factory building. Alternatively, the company's architectural, engineering, technical and building staffs will get out a scheme and submit estimates in consultation with the manufacturer.

Smokeless Fuel and Oil

Development of the Salerni System

REFERENCE to a scheme for the development on a commercial scale of the Salerni system of low-temperature carbonisation of coal was made at the annual dinner of the Midland Institute of Mining Engineers held in Sheffield, on Friday, February 19. The Salerni system, which provides a smokeless fuel and oil, is largely the outcome of researches which Commandatore Piero Salerni has carried out at Sheffield University.

Professor R. V. Wheeler, president of the Institute, expressing regret at the absence through illness of Sir Eric Hambro, the banker, said Sir Eric had written a letter in which he announced his decision to put down the first Salerni plant in Sheffield. Sir Eric added that he proposed to put forward a scheme for the installation of Salerni plants in the future at collieries on such terms as would not affect the finances of the owners or of the collieries which desired to have the plant.

Viscount Galway, who proposed the toast of the Institute, said that the coal industry was often looked upon as comprising two sets of people perpetually in conflict—the owners and the miners. Such a view was not accurate; for one thing, it overlooked the technical experts which that Institute represented. For the experts there still remained a wide field of research in such problems as smoke abatement and the prevention of accidents in the pits.

Outline of the Salerni Process

Commandatore Piero Salerni has now prepared a paper giving full details of his system for the first time. Briefly, the process consists in heating to a temperature of about 450° C. by external application of heat in a retort of the revolving drum type, a blend of comminuted coal and semi-coke so finely ground that its porous structure is destroyed, pitchy fractions of the oil from the process itself being added to the blend. The blend is introduced at one end of the drum, travels through it, and is discharged at the other end in the form of coke—introduction, travel, and discharge taking place continuously by gravity action. The prevention of overheating has been achieved by the simple device of subjecting the outer faces of the heated plates to the action of cool gases. This, in the opinion of the inventor, is the outstanding feature of the design. The introduction into the blend of the pitchy fractions of the oil from the process results not only in an improvement in the quality of the oil ultimately produced by keeping it free from dust, but also in a somewhat higher yield of lighter oils.

Low-temperature carbonisation would transform that slack into a block fuel and incidentally remove the smoke-giving constituents, which would be removed largely in the form of oil. The block fuel produced by the process which Commandatore Salerni had been able to work out at Sheffield University was, he claimed, of greater density than that produced by other processes, and it burned with a brighter flame. Moreover, 10 per cent. of the total slack was recovered as oil which could be used in internal combustion engines or for any purpose which natural oil served. In other words, from slack coal could be produced fuel oil, the competition of which was hitting the British coal industry so badly. Sir Eric Hambro's scheme was not to float any public company. His proposal was first of all to lay down a plant in Sheffield which would test and prove the merits of the Salerni system of low-temperature carbonisation. Once the scheme was proved, Sir Eric was prepared to arrange for plants to be put down at the various collieries without imposing upon the owners, whose resources in present conditions for development of this kind were limited, the necessity of any large capital outlay.

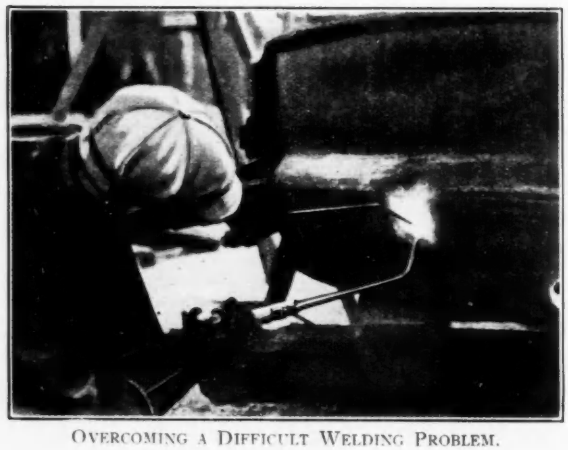
British Imports of Litharge and Red Lead

DURING 1930 total imports of litharge were 22,153 cwt., or a gain of 20 per cent. over quantity imported preceding year. Germany was the principal shipper, sending approximately 60 per cent. Italy which sent 2,435 cwt. in 1929 was not represented in 1930. Imports of the pigment from the United States jumped from 974 cwt. in 1929 to 4,006 cwt. for 1930. Red lead imports in 1930 amounted to 57,556 cwt., or an increase of 16,328 cwt. as compared with 1929. Germany was the leading supplier forwarding 42,872 cwt.

Oxy-Acetylene Welding in Repairs

Reinstating Discarded Plant

AN excellent example of the technique of repairing cracked gray iron castings of unusual shape by oxy-acetylene welding in connection with the reclamation of a fractured steam-jacketed kettle is reported in the February issue of *Oxy-Acetylene Tips*. During one of the service operator's calls at this plant, the superintendent pointed out the old kettle and mentioned that it had lain in one spot just outside the building for well over five years and that no one had as yet been able to devise a means of repairing the crack in it. Inspection showed a 4-ft. diameter kettle about 2 ft. deep with a steam jacket, which was an integral part of the casting, running circumferentially around the lower half in which there was a crack about 2 ft. long. The crack was also in a circumferential position on the outside of the jacket, parallel to the lip of the kettle.



OVERCOMING A DIFFICULT WELDING PROBLEM.

Knowing the high cost of a new kettle (about £105) the plant superintendent did not care to scrap it until he was certain it could not be repaired. Because of the nature and location of the fracture, the plant shop had hesitated to attempt a repair. The service operator, therefore, suggested that he be permitted to supervise a repair welding job, as he saw no reason to believe that with the proper procedure for bronze-welding carefully followed, it could not be put back into service again.

Anticipating the Possible Course of the Repair Work

Accordingly, the plant welder was instructed to clean off the metal thoroughly adjacent to the crack, and then to vee the entire fracture to a point about 2 in. beyond each end. Chipping further than the visible end of the crack made certain that the actual end had been reached and prevented the possibility of the crack extending further during welding. Further analysis of the probable stresses that would be set up in the cast iron on applying the welding heat convinced the service operator that with bronze-welding the heat would not be great enough to necessitate any preheating, either local, or of the entire kettle. He was of the opinion that any expansion that would take place would be in an outward radial direction, and since the crack was on the outer rim of the jacket bulge, it was as though placed on an expansion joint. The consequent contraction of the metal after welding would not, then, tend to place much strain on either the weld metal or the adjacent cast iron, but would rather act to draw the welded crack inward in much the same fashion as a section of a bellows. Having thus carefully worked out the probable reactions, the bronze-welding was started. As it was necessary to work on the vertical side of the kettle, a shoulder of bronze was first built up on the cleaned cast iron surface just below the crack and parallel to it. This gave a firm foundation to work on and the bronze-welding of the fracture was soon completed. After the final operation a hydraulic test of 40 lb. per sq. in. pressure was successfully applied, this being twice the normal working pressure of the jacket.

Fine Chemicals of British Manufacture

A Buyer's Notes on the Chemical Section at Olympia

The visitor to the Olympia Section of this year's British Industries Fair will notice that an extremely wide range of fine chemicals are now being produced by British chemical manufacturers. Not only are new products being shown for the first time; there are also many products exhibited in new degrees of purity. Another outstanding feature will be found in special displays of bromine and bromides from Empire sources. These notes have been specially contributed to this issue of THE CHEMICAL AGE.

AT the stand occupied by Howards and Sons, Ltd., of Ilford, it is observed that this firm are the only English manufacturers of lactic acid B.P. It is not surprising, therefore, that they are also first in the field with a range of metallic lactates which now includes the calcium, bismuth, magnesium, sodium, copper, nickel, mercury, silver, zinc and ferrous salts. In addition, they are also showing the double lactate of calcium and sodium, and calcium lactophosphate, which, like the single lactates, are already finding pharmaceutical and other uses. Howards and Sons are also displaying isopropyl alcohol for use in the essence, perfumery and confectionery trades. This product has a notable high degree of purity. In contains from 95 to 96 per cent. of the actual alcohol, the remainder being water, and is therefore entirely free from acetone, petrol-hydrocarbons and other impurities which are present in commoner grades. Among other products recently placed on the market is a new quinine salt, quinine bi-salicylosalicylate, to which the name of Quinisan has been given. This product has its chief advantage pharmaceutically from the fact that it is practically insoluble in water, but in the dilute gastric juice it separates into its components—quinine and salicylosalicylic acid—so that gastric irritation common with other salicylic preparations is avoided.

Shawinigan, Ltd., the English branch of Shawinigan Chemicals, Ltd., of Montreal, Canada, have a display of acetic acid (which they supply to the exacting demands of the artificial silk industry, the pharmameutical trade, for rubber coagulation, and in 80 per cent. edible and 80 per cent. technical grades); acetylene black (which is supplied to the dry battery, rubber and colour manufacturers, in various degrees of compression ranging from 50 to 110 per cent); and commercial paraldehyde, which can be easily reconstructed into acetaldehyde, and is therefore a convenient form of acetaldehyde for transport purposes. Acetaldehyde boils at 21° C., and is therefore difficult to ship during the warm months, but when converted into paraldehyde its boiling point is raised to 124° C., thus permitting it to be handled safely under all normal circumstances. Vinyl acetate products are also shown at this stand. Being an unsaturated ester, vinyl acetate is extremely reactive and forms the starting point for many chemical syntheses. It is, however, its tendency to polymerise which has attracted the greatest attention. Shawinigan can now offer a whole range of simple vinyl polymers which vary in degree of polymerisation, viscosity and softening range. They have actually been produced in the laboratory in a degree of polymerisation low enough to permit distillation in high vacuum; others are extremely hard and horny, and only become plastic at temperatures approaching the decomposition point. Between these extremes there are bodies which are adaptable to a great variety of uses such as moulding powders, liquid cements, safety glass, lacquers, etc.

Among the new products on the stand occupied by Johnson and Sons (Manufacturing Chemists), Ltd., of Hendon, is a new organic compound of colloidal silver (Arvitin). which is essentially a preparation of silver combined with vitellinic acid from egg yolk. Here is also exhibited Chlorquinol, for use as a photographic developer, in substitution for Hydroquinone; and Bloodit, which is a synthetic "dragon's blood," for use in substitution of the natural product to meet the exacting demands of the process engraving trade. The acid resisting qualities of this product are more pronounced than those of the natural resin, and when heat is applied there is a distinct tendency to expand whereas the natural resin usually contracts.

Special reagents for use in the laboratory are a feature of the exhibit of the General Chemical and Pharmaceutical Co., Ltd., of Willesden. Among the new Judex brand reagents shown for the first time are allyl-iodide-hexamine for the determination of cadmium, even in the presence of a large excess of zinc; and sodium 5-nitro-6-chloro-toluene-3-sulphonate for the detection of potassium. In use a 5 per cent. aqueous solution of the latter reagent is added to the cold liquid under examination, either of neutral or slightly acid reaction, and the sides of the test-tube are scratched with a glass rod; in the presence of 2 mg., or even less, of potassium iron in 5 cc. of solution glistening plates of the potassium salt quickly appear. The use of this reagent, in conjunction with the Judex special reagent for sodium—di-hydroxytartaric acid—removes the necessity for carrying out the tedious separation of magnesium, with the consequent blank determinations on the reagents, before estimating sodium and potassium, thus considerably reducing the time required for these determinations.

Bromides made from Empire bromine, derived from the Dead Sea deposits which are now being worked in Palestine, are displayed by Whiffen and Sons, Ltd., of Fulham; May and Baker, Ltd., of Battersea; and Howards and Sons, Ltd., of Ilford. The firm of Whiffen are also showing potassium iodide in the purest form commercially obtainable, this salt having been one of their specialities for nearly a century. A new vegetable product derived from Carragheen (Irish moss) is also to be seen at this stand; it is at present being sold as a superior alternative to gelatine for use as an ice-cream stabiliser. Here also are a number of pharmaceutical products including caffeine, natural camphor, clove oil, and salicin. At May and Baker's stand the pharmaceutical products include a range of bismuth salts, including bismuth subgallate of remarkable fineness, chloroform, santonin, phenolphthalein, and ephedrine and its salts for use as a substitute for adrenaline. Here, too, there are several items of industrial interest, such as cadmium salts for the plating industry; cobalt salts for the oil, paint and varnish trades; and molybdates for the electric lamp manufacturers and the steel industry.

Other stands which deserve a special visit are those of A. Boake, Roberts and Co., Ltd., of Stratford; W. J. Bush and Co., Ltd., of Hackney Wick; Thomas Tyrer and Co., Ltd., of Stratford, and Thomas Morson and Son, Ltd. Boake Roberts are making a speciality of solvents and plasticisers for the lacquer industry, and are showing many new products including variants in the Abracol range; also a special range of metallic soaps which include oleates, stearates, linoleates, tungates, palmitates and resinates with a definite metal content. W. J. Bush and Co. are featuring flavour essences, essential oils, terpeneless oils, isolates and floral products. Their latest productions are phenyl ethyl alcohol, amyl cinnamic alcohol and citronellol. Tyrer's are showing a range of chemicals for the oil, paint, rubber and perfumery and cosmetic trades, as well as a range of pharmaceuticals, including bismuth salts, citrates and scale preparations. Iodides, iodoform and glycerophosphates are to be seen at Morson's stand, together with soluble "kreosote" which is now finding extended uses in various branches of industry due to its exceptional properties and constant quality. Hopkin and Williams, Ltd., are drawing attention to their well-known range of analytical reagents and to various fine chemical products, such as hippuric and malonic acids, chrome alum of various grades and unanium salts.

Free Lime in Building Materials

A KNOWLEDGE of the amounts of hydrated and unhydrated free lime in cements and other building materials is frequently of the utmost importance. The complexity of many of those materials, however, makes the accurate estimation of free lime a matter of considerable difficulty. Apart from the methods made available or suggested by other investigators, certain methods have been modified or developed at the Building Research Station. These methods are reviewed comprehensively in Building Research Special Report No. 17, published by the Department of Scientific and Industrial Research (H.M. Stationery Office, price 6d. net).

A Review of the Birmingham Section, B.I.F.

Some of the Chemical and Engineering Stands

Although the chemical industry has its main display at Olympia, there are also many exhibits of interest to chemical engineers at the Birmingham Section of the British Industries Fair at Castle Bromwich. In our last issue we gave details of the various stands at Olympia, and below will be found a survey of some of the principal features at Birmingham.

THE Birmingham Section is bigger this year than it has ever been since it was inaugurated in 1920. The permanent buildings have been enlarged by 40,000 sq. ft., bringing the total exhibiting space to 243,000 sq. ft., which is three times as much as there was at the first Fair twelve years ago. There are approximately seven miles of stand frontage. The Fair buildings now cover 13 acres, standing in 50 acres of grounds, and there are many exhibits outside. The number of exhibitors is 1,027, or 60 more than in 1931. The new extensions and improvements have cost £20,000, and include a Royal Room, special committee room, dining rooms, a buffet bar 50 yards long, and vast kitchens with the latest electric and gas equipment. The buildings have been redecorated outside in primrose and green, and the arrangement of entrances is such that the buyer is now enabled to go straight to the exhibits in which he is interested without having to pass through crowded gangways.

More has been done than in any previous year to "make buying easy." Brochures imprinted with the appropriate national flag, have been sent to 40,000 prospective buyers in all parts of the world. These brochures contain all that the buyer wants to know about the Fair, including a guide to the best means of travelling, and a list of the substantial concessions which have been made by the passport authorities, railways, shipping and air lines. In addition, an "index to articles manufactured" has been prepared for the first time. This index contains not only exhibits, but the many articles which exhibiting firms are not showing. By stating their interest, foreign buyers can thus be immediately supplied with a complete list of the firms manufacturing the goods they mention. The Fair in Birmingham is organised and controlled by the Birmingham Chamber of Commerce under the aegis of the Department of Overseas Trade.

In the Metals Section, the latest triumphs of the metallurgist are seen in high-speed steels and new non-ferrous alloys for special industrial purposes, such as the important non-corrosive alloy of nickel-copper, which is used for making tubes for oil and water cooling. Methods of "weather proofing" metal are displayed, one chemical process, it is claimed, rendering the surface of iron and steel impervious to moisture without affecting its dimensions, temper, or magnetism. Methods of spraying liquid metal are demonstrated. New types of furnaces for case-hardening and heat-treatment of steel and new portable forges are surprising foreign industrialists who annually visit the Fair.

Development of Plastics Trade

The development of the plastics trade, one of the newer British industries has been exceptionally rapid. The exhibits indicate that the electrical trades absorb more of these plastic products than any other branch; but their uses are extending in the manufacture of telephone instruments and exchange equipment. They enter largely into the wireless trade, and motor car and aeroplane-builders are applying them to an increasing extent.

In view of the fact that the manufacture in Britain of plastic moulded articles is stated to have multiplied tenfold in two and a half years, it is not surprising to find they have been grouped in a special section. A remarkable new "thermoplastic" material, which is transparent and can be made in any colour, is being shown for the first time. Among the scores of different articles which will be made from it is the transparent fountain pen, which will show plainly when it is running dry. There is also an elastic varnish, which will not crack, however much the metal on which it is painted bends or contracts. The resinoid powders which form the base of plastic products are now available at little more than one-third the price ruling ten years ago.

For the first time the Birmingham Section includes a group of exhibits showing the uses of oil fuel for industrial processes. On a composite stand, organised by one of the big oil companies is a comprehensive array of oil-fired furnaces and oil-burning equipment representing the latest developments in the applications of liquid fuel in industry. These furnaces are shown in actual operation. Remarkable progress has been made in the efficient use of oil fuel. From the comparatively crude apparatus of ten years ago, the oil furnace, with its accompanying controls, has developed into the precision instrument of to-day.

The Gas Industries Section

The Gas Industries' Section occupies an area of 41,000 sq. ft., and the stands of the 70 exhibitors are decorated in green and yellow. This Section shows what gas is doing in home and industry. Many full-sized exhibits of industrial gas-fired furnaces and models and photographs of gasworks plant are on show. The Information Bureau is provided by the British Commercial Gas Association, and members of the Society of British Gas Industries.

Gas is being largely used for lighting, heating, and cooking at Castle Bromwich. During the 1931 Fair the total gas consumption was nearly 5,000,000 cubic feet. This year, according to Mr. R. J. Rogers, hon. secretary of the Gas Industries' Section, the consumption should be quite as high. About one hundred and sixty 1,000 candle-power gas lamps are used for overhead lighting in the Fair, as well as three powerful lamps over the main entrance. In addition about 300 gas lamps of various kinds are in use on individual stands and in the kitchens and other rooms.

Electrical Section

With the exception of a complete 132,000 volt sub-station for the National Grid electrification scheme erected outside on the south-west side of the Exhibition buildings, the whole of the exhibits of 76 British electrical manufacturers are concentrated at the eastern end of the building. A further increased area has been made available this year to accommodate the large volume of electric plant and appliances.

Manufacturers of heavy electrical appliances, dynamos, alternators, switchgear, transformers and industrial electrical plant and accessories are well represented by nearly 40 exhibitors in this section, and many in the machinery sections allied to the electrical industry. Electric pumps, similar to those to be used in salving the M2, are exhibited, furnaces for the smelting of brass for making telephone and electrical accessories, and an electric fan, 13 feet in diameter, for ventilating the new Mersey tunnel.

Keep Britain Busy

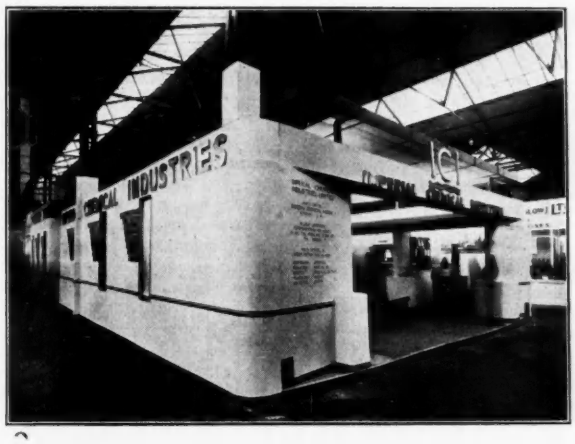
Presiding at a Press luncheon at the Fair on February 19, Mr. E. W. Bache, chairman of the Birmingham Chamber of Commerce, said he was gratified to find the slogan which the Fair authorities adopted many years ago, "Buy British," had now been taken up nationally, and was being generally acted upon.

Mr. J. Percy Plant, chairman of the Publicity Committees, proposing the toast of the Press, said the Birmingham Chamber of Commerce felt a so-called cheap thing from abroad was dear if it put our own people out of employment. The Fair had one text, and one only—"If you want to keep Great Britain great, you've got to keep Britain busy." For more than a decade those Fairs had stood out as a combined manufacturers' effort to create exports for our country, and consequently to prevent imports. Both were equally urgent, and at long last the President of the Board of Trade and the Chancellor of the Exchequer were hoping for just what the Fair had been working for from its inception—that was, a better balanced commodity trading account. The sheer pressure of economic circumstances, £2,000,000 a week on the wrong side, had forced the conclusion that it was production that really mattered, and that we had to produce more at home and buy less abroad. That Fair told the world, as Great Britain never told the world before there was a Fair, just what they had got to sell. Their trading policy to-day told the world that "if you want us to continue to be big

Some Chemical Stands at Olympia

LEFT: A. Boake, Roberts and Co., Ltd.
Thomas Tyrer and Co., Ltd.
Imperial Chemical Industries, Ltd.

BELOW: W. J. Bush and Co., Ltd.
Shawinigan, Ltd.
Imperial Chemical Industries, Ltd.



customers of yours, you must also be big customers of ours." He thought it was a happy augury that, for the first time in the history of the Fair, as from March 1 the Fair's aim and the national trading policy's aim would be identical. Indeed, they had confirmation of this reach for better trade balance, for one State in Europe was sending a deputation to the Fair. That State was anxious to have us continue as their biggest customer, and they were coming here with the avowed and sole object of buying more from us to ensure the continuance of that biggest customer position.

British Road Tar Association

This year the British Road Tar Association is exhibiting in the Quarry Section. The stand takes the form of an attractive cinema theatre, accommodating 45 people, in which the Association's industrial talking film, "Coal Mine to Road," is being exhibited. This film has been made at coal mines, coke ovens, gas works, tar distilleries and on the highways all over the country. It shows that tar is an all-British material, and can justly claim to have been the earliest of all modern road-surfacing materials. British tar to Standard Specification has all the characteristics essential for the construction of road surfaces capable of withstanding modern traffic conditions, and is easy to apply and economical to maintain.

Thomas Firth and John Brown, Ltd.

The stand of Thomas Firth and John Brown, Limited, again shows the remarkable advances made during the year in the application of Staybrite steel to domestic and engineering fittings. The advances in the technique are, this year, of an even more notable character than those of past years, owing to the progress of scientific research resulting in the inclusion of remarkable new patented steels in the Staybrite family. Chief amongst them is Firth patented F.D.P. steel, which has been introduced to meet conditions under which the proper heat treatment of bulky fabricated and welded plant is impossible owing to lack of facilities in furnace capacity, etc. Firth patent F.D.P. steel when fabricated needs no heat treatment, and completely avoids all complications of disintegration at both heavily manipulated points and welded joints. On the other hand, manufacturers have been more than usually successful in their application of Staybrite steel to the domestic markets, and apart altogether from the cleverness and quality of most of their products, the market for these modern lines has been found to be increasingly responsive. The stand stages a complete exhibit of Staybrite domestic wares created by leading manufacturers, together with technical exhibits of interest to manufacturers.

Fraser and Chalmers Engineering Works

The exhibit of Fraser and Chalmers Engineering Works includes a selection from the wide range of plant manufactured at Erith, such as conveying and screening plant and rolling mills. The conveying plant includes two 16 ft. Fraser and Chalmers-Redler conveyors, which form an economical solution to the problem of conveying powdered, granular and small, lumpy substances. Round two sides of the stand runs a Webb conveyor, a type that has only recently been introduced to this country for the circulation of raw material and work in production in factories. The Sherwen screen incorporates a new principle in vibrating mechanism. The moving frame is mounted on spring slats of hickory or ash and given 2,400—3,000 vibrations per minute by two solenoids controlled by a make and break mechanism. The amplitude and rate of vibration and the screen angle can be adjusted during operation. There are no bearings, pulleys, belts or shafting, and the power consumption is very small. The same principle has been successfully applied to concentrating tables for coal, sand, slimes, etc. The more usual types of conveyors and screens are exemplified by a 20 ft. portable conveyor and a single-deck Gyrex screen, both of the Robins type, and driven by 3 h.p. and 5 h.p. motors respectively. A model washer is shown to demonstrate the principle of a patent sand flotation process of washing coal that has recently been introduced. This process is a commercial application of the laboratory float-and-sink tests, which are used for determining the washability of coal. The expensive high-density chemical solutions used in the laboratory are replaced by a mixture of sand and water, which is kept in a fluid state by mechanical and hydraulic agitation. The density of sand and water mixture, which can be varied, is arranged so that the coal floats and the dirt sinks. A steam-heated dryer is also shown, the steam flowing in two directions. A "Bliss" cluster rolling mill, one of the smallest of the type made, draws attention to these highly perfected precision machines. The whole of the motors and control gear used to operate the exhibits were made at the G.E.C. engineering works, Witton, Birmingham.

General Electric Company, Ltd.

The main exhibit of the General Electric Company, Ltd., consists of a demonstration of Osram lamp manufacture with some of the latest machinery employed at the Osram G.E.C. lamp works. The whole of the lamp manufacturing display is surrounded by a railing of Magnet conduit tubing in "Silverlac" finish, an attractive silver-grey colour recently introduced. Four boards show a selection of Magnet bakelite bells and accessories, together with the luminous indicator service system, and the Gecophone hand combination telephone made in bakelite. The whole of the motors and control gear used to operate the exhibits was made at the G.E.C. engineering works, Witton, Birmingham. The 132,000 volt outdoor sub-station erected outside the main building of the Fair represents part of an "L.E." type of sub-station, and comprises a 132,000 volt 3-phase oil circuit breaker, and a set of 132,000 volts rotary isolating links mounted on concrete pedestals.

G. A. Harvey and Co. (London), Ltd.

The extensive range of perforated metals shown on this stand are of particular interest, the innumerable patterns needed for all kinds of sifting, sorting, filtering and grading such diverse materials as coal, stone, cereals, food products, chemicals, etc., are amazing. A catalogue of perforated metals produced by this company illustrates convincingly the range of tools that this firm possess. Slots 1½ in. by ⅜ in. wide through ⅞ in. thick steel to round holes 0.015 in diameter prove that the technical difficulties presented are easily overcome by experience gained during a period of nearly sixty years. Woven wire cloths are also produced by this firm in all metals and gauges, and the uses vary to a similar extent to those of perforations. Considerable progress has been made in this country recently in the canning industry, and Harvey's horizontal processing retort exhibited will prove of interest to those connected with this industry. This firm specialises in all kinds of plant needed in food manufacture, and produce vertical processing retorts, vacuum drying, evaporating and distilling plant, sterilisers, jacketed pans, exhausters, cooling tanks, vacuum sealing tanks and can and bottle crates.

High Speed Steel Alloys, Ltd.

This firm is showing applications of vanadium, tungsten, molybdenum, etc., in steel and iron for various engineering industries. Tests and complete physical data are also given which show the advantages of these additions. Among some of the uses indicated are high pressure and temperature applications, high speed steels and dredger equipment. A recent development, which has created great interest throughout the country, is the addition of molybdenum to steel and iron rolls, examples of which are given.

W. C. Holmes and Co. Ltd.

The Holmes stand this year, besides showing full-sized examples of Holmes-Connersville exhausters (one of these on the stand being on order for the Dudley, Brierley Hill and District Gas Company), gas meters and blowers draws the attention of the gas industry to the advantages of their latest form of Dri-Gas plant, in which are combined in the one installation gas dehydration, naphthalene extraction and continuous naphthalene and benzol recovery. Drawings and photographs of this latest invention, together with statistics, show that, with such a plant, the operation of gas drying and naphthalene removal can be carried out, not merely free of cost, but as a profitable extension to gas undertakings and revenue producing activities. The oil regeneration unit may be added to any existing form of napthalene washing apparatus. Apart from several installations of the new combined plant, this company has already built, or has in course of construction, several of these plants for naphthalene and

benzol extraction on works where previously the wash oil has been disposed of in water gas plants or by sale to tar distillers, etc. A number of models of individual pieces of gas apparatus manufactured by W. C. Holmes and Co., Ltd., are also exhibited. One of the most interesting is that of the new industrial consumer's meter known as the B.M. gas meter. This meter is specially suitable for capacities of from 700 c. ft. per hour and upwards, and complies with the provisions of the Sales of Gas Act with regard to stamping.

Thomas Howse, Ltd.

On this stand there is exhibited the latest types of stoving and air-drying japans in all colours, synthetic resin varnishes and enamels for modern processes of finishing, anti-corrosive steelwork paints for constructional steelwork, new cracking and ripple laquers and plastic and acoustic texture compositions for the decorator's purposes; new anti-fungoid enamels for use in hospitals, breweries, food stores, etc., are also shown.

Imperial Chemical Industries, Ltd.

The Cassel Cyanide case-hardening process is demonstrated on Stand No. 15 C/3. Hardening by the cyanide process dispenses with time lost in packing the articles in the compound, luting the boxes and in heating-through the non-conductive cement. Work can be hardened to a depth of 1-64 in. within one hour of leaving the automatic, or to a depth of 1-32 in. in 2½ hours. This obviates delay or congestion in the hardening shop, and the remarkable speed of the cyanide case-hardening process is one of the reasons for its steadily increasing popularity. The plant required to operate this cyanide process is quite simple. The standard self-contained portable unit, which occupies a floor space of 27 in. by 27 in. with a height of 6 ft. 6 in. to the top of the canopy, will take 50 lb. of machine parts at a charge. This furnace has such recuperative capacity that it will bring its full load to the carburising temperature of 950° C. within 20 to 30 minutes.

On Stand No. 16 E/2 there is an example of the part being played by the British chemical industry in improving processes in other trades. This is an exhibit which demonstrates a development of the use of soda ash in the manufacture of iron, which is of importance to all British manufacturers of iron and steel. Briefly, the process consists of adding a quantity of soda ash to the ladle into which the molten metal is poured at different stages in its manufacture. It has been found that the addition of this cheap industrial chemical has the effect of cleaning the iron, especially in reducing the sulphur content. Treatment with soda ash also results in a tougher iron at the same time as in a lowering of production costs.

A chemical which has properties for the removal of rust from metal articles is one of the exhibits of Nobel Chemical Finishes, Ltd., at Stand No. 16 J/2. This Deoxidine rust remover is brushed on the article, which is subsequently washed with warm water, and the resulting surface is completely free from rust and ready for immediate painting. Demonstrations of this interesting product are being given. On Stand 13.F/1, Nobel Chemical Finishes, Ltd., and the Fredk. Crane Chemical Co. are showing an entirely new range of finishes called Dulux. These represent the greatest advance in paint manufacture for many years, since they are not made from the usual gums, resins and oils, which, being natural, must vary in quality, but from synthetic gums and oils, which can be chemically controlled and guaranteed uniform in quality. These new Dulux finishes are claimed to differ from any other oil, synthetic or cellulose finishes at present on the market.

I.C.I. Metals, Ltd.

An unusual exhibit of non-ferrous metals and their uses has been organised by I.C.I. Metals, Ltd. (which embodies Kynoch, Ltd., The King's Norton Metal Co., Elliott's Metal Co., Ltd., Muntz's Metal Co., The Hughes Stubbs Metal Co., Wm. Cooper and Goode, British Copper Manufacturers, Ltd., Grice, Grice and Son, and Allen Everitt and Sons, Ltd.), and occupies one of the largest stands at Castle Bromwich. The central feature is the office building, set centrally on the stand, and consisting of a hallway flanked by offices, for interviews, etc. The whole building is roofed in copper, a feature of this roof being its pleasant greenish patina. The metal exhibits themselves are divided roughly into six groups—strip and sheet, plates, rods, wire, tubes, and sundries, and are intended to indicate the scope of the company's activities in non-ferrous metal manufacture. In the plate section there are large condenser plates, attention being directed to their perfect surface. There is a very comprehensive display of tubes of various kinds, including examples of the famous AE "Super-nickel" and "Alumbro" types, together with those of the Admiralty and other alloys. The company's manufactures in strip and sheet are illustrated by a new method of treatment, with suitable illustration, demonstrating the finish and flatness of the sheet in various alloys, while similar material in the form of strip is draped artistically in the same section. Coils and sheets of metal in the usual alloys are also displayed for examination by visitors. Rods and extruded sections are shown in a large number of shapes and sizes in copper and its alloys, and with a special exhibit of sections.

Meldrums, Ltd.

This firm is occupying increased space this year in order to give a better display of their well-known specialities. The Cochran boiler, which applies steam for heating in the Exhibition Hall, is this year fitted with Meldrum's forced draught system. This comprises one of their furnaces, specially designed for Cochran boilers, together with smoke prevention door. The chief feature on the stand is a full-size Lancashire boiler front. One half of this front shows the firm's latest design of sprinkler stoker, which is arranged with the firm's new type of self-contained motor drive. This obviates the necessity for putting up overhead shafting, and makes an extremely compact arrangement. On the other flue is shown an automatic chip stoker for wood refuse. Here the wood chips are delivered from the cyclone collector into the hopper and automatically delivered into the boiler furnace. Meldrum's activities in chemical plant are illustrated by one of their new design centrifugal acid pumps. This is constructed in "Meldrum" acid resisting metal, which is entirely proof against sulphuric, nitric, and acetic acids. A wide range of cocks and valves of every description, steam jet elevators, exhausters, compressors and boiling jets are also shown. These are manufactured in "Meldrum" metal, Regulus metal, gunmetal or cast iron.

United Steel Companies, Ltd.

Amongst the exhibits demonstrating the wide range of manufactures of the associated companies comprising the United Steel Companies, Ltd., are a series of showcases containing specimens of steel sections and plates (Frodingham and Appleby Companies), steel rails and sleepers (Workington Company), special steel wires and cold worked steels for the textile industries (S. Fox and Co.), drop stampings and small forgings (D. Doncaster and Sons), and of steel billets, bars, and strip and articles made therefrom. There is also a representative display of miscellaneous forged steel shafts, press cranks and other parts by Steel, Peech and Tozer and D. Doncaster and Sons. United Strip and Bar Mills contribute specimens of various kinds of strip and bar, and there is also an exhibit of "Phoenix" free-cutting steel. Castings from various qualities of heat resisting steel are shown by D. Doncaster and Sons. Another part of the stand is taken up with "Stockbridge" special alloy steels by S. Fox and Co., Ltd.

Wild-Barfield Electric Furnaces, Ltd.

At this stand both vertical and horizontal types of Wild-Barfield electro-magnetic hardening furnaces are in operation. The advantage of this type of furnace is the indication given to the operator of the exact moment when tools or parts in carbon, carburised and low alloy steels should be quenched. The new Wild-Barfield pit type furnace with forced air circulation is in daily use for tempering springs. Herbert Terry and Sons, Ltd., the well-known spring manufacturers, who use these furnaces in their works, are co-operating in this exhibit, having diverted a portion of their spring production to the furnace on the stand, so that visitors can see tempering carried out on the most up-to-date plant. The Wild-Barfield-Foster charge progress recorder is used in conjunction with the furnace, and not only controls and records the furnace temperature, but records also the progress of the charge itself, notifying the operator when the charge being tempered has reached the desired temperature.

Scientific and Optical Instruments

Exhibitors at Olympia

THE scientific and optical instruments section at Olympia includes a considerable number of exhibits for use in the chemical industry. This section is situated in the Grand Hall, adjoining the Canadian Section, at the far end from the chemical group. Following is a list of the exhibitors :—

	Stand No.
Baird and Tatlock (London), Ltd., London	A.121, A.138
Baker, Charles, London	A.121, A.138
Barr and Stroud, Ltd., London	A.120
Beck, R. and J., Ltd., London	A.121, A.138
Becker, F. E., and Co., London	A.121, A.138
Bellingham and Stanley, Ltd., London	A.197
Black, B., and Son, London	A.198
Brown, S. G., Ltd., London	D.47
Casella, C. F. and Co., Ltd., London	A.121, A.138
Chance Bros. and Co., Ltd., Smethwick	A.121, A.138
Cussons, G., Ltd., Manchester	A.121, A.138
Ellis Optical Co., London	A.196
Gowllands, Ltd., Croydon	A.121, A.138.
Hamblin, Theodore, Ltd., London	A.221
Harris, W. J. (Birmingham), Ltd., Birmingham	H.53
Hilger, Adam, Ltd., London	A.121, A.138
Johnson, Matthey and Co., Ltd., London	D.31
Newton & Co., London	A.121, A.138
Nobbs, George, Ltd., London	A.200
Parsons Optical Glass Co., Derby	A.121, A.138
Reeves and Sons, Ltd., London	G.4
Ross, Ltd., London	A.121, A.138
Short and Mason, Ltd., London	A.189
Silvertown Co., The, London	F.50
Thermal Syndicate, Ltd., The, Wallsend-on-Tyne	C.63
Thornton, A. G., Ltd., Manchester	A.121, A.138
Tintometer, Ltd., The, Salisbury	A.187
United Kingdom Optical Co., Ltd., The, London	A.121, A.138
Watson, W., and Sons, Ltd., London	A.121, A.138
Webb, William A., Ltd., London	B.98
Wray, Ltd., Bromley	A.186

New Technical Books

MOST books on the subject of lubrication and lubricants are of a specialised character, but it is doubtful if they are as explanatory as *Lubricating Oil Tests and their significance* by J. E. Southcombe (Henry Wells Oil Co., Ltd., Salford, pp. 69, price 2s. 6d. net). This book deals with all essential points concerning the testing of lubricating oils in the laboratory—specific gravity, flash point, cold test, viscosity, carbon residue, sludging and oxidation, demulsification number, colour and chemical impurities. A considerable amount of progress has been made in recent years in our knowledge of the testing of oils, and while the author does not suggest that oils can be judged simply on laboratory work it is possible now to forecast with some accuracy what a lubricant is likely to do under practical working conditions. To do this, however, it is essential to take into consideration such factors as " oiliness " —the property that enables an oil to form an adsorbed film on the metal surfaces—and the ability of an oil to resist oxidation. Until recently no accurate method of measuring " oiliness " was known, but Mr. Southcombe in a note on this important subject describes a new " oiliness " testing machine that has proved satisfactory.

* * *

DURING the winter of 1929-30, two series of lectures upon coal were arranged by the Coal Trade Luncheon Club, since when a number of requests for the publication of these lectures have been received from those who were unable to be present. The Coal Trade Luncheon Club and the Institute of Fuel have therefore collected together in one volume, not only the substance of these lectures, but also information written by experts in all the various branches of the coal industry, which has now appeared under the title of *The Preparation, Selection and Distribution of Coal* (Industrial Newspapers, Ltd., London, pp. 182). Dr. J. G. King explains the information to be obtained from coal analyses, which is of practical use to those interested in coal and its uses. The principles and methods of mining coal are dealt with by Professor K. Neville Moss; the preparation of coal for the market is the subject of a chapter by Dr. D. T. Davies, of the Fuel Research Station; and the transport and distribution of coal is treated jointly by Lord Hyndley, H. Cecil Roberts and John Charrington. In the section devoted to the utilisation of coal, the joint authors include M. Harmen Lewis (steam raising), Dr. B. G. King (carbonisation), H. L. Pirie (anthracite for industrial purposes) and A. T. Grisenthwaite (coals for gas producer practice).

* * *

THE thirteenth edition of Clowes and Coleman's *Quantitative Chemical Analyses* (Churchill, pp. 604, price 18s. net) has been revised by D. Stockdale and J. Dexter, who have been respectively responsible for inorganic analysis and organic analysis. No major changes have been made in the arrangement of the book. Part I deals with the general operations required in analytical work; Part II and III are devoted to the gravimetric and volumetric analysis of pure compounds. The descriptions of electrolytic and colorimetric estimations, which were formerly scattered throughout the book, have now been collected and amplified in Part IV, which is essentially new and treats of miscellaneous methods of analysis. Part V deals with the general analysis of materials, both inorganic and organic. As the *pH* notation is now of great importance and chemists are often reluctant to encourage it, a section on the electrometric method has been included. The theory of the hydrogen electrode is set out shortly, introducing the measurement of *pH* in a semi-quantitative manner. On the other hand as the use of the bright platinum electrode is of great importance to the analyst than is the hydrogen electrode, the electrometric estimation of certain elements by oxidation-reduction methods has been dealt with in greater detail.

* * *

THE amount of work on the subject of fermentation which has appeared since the publication of the third edition of *Alcoholic Fermentation* by Arthur Harden, has now justified the appearance of a fourth edition of this book (Longman, pp. 243, price 15s. net). The subject matter given is essentially based on courses of lectures delivered at London University and the Royal Institution during 1909-10. An account is given of the work done on alcoholic fermentation since Buchner's epoch-making discovery of zymase, only in so far as it appears to throw light on the nature of the phenomenon. Certain interesting subjects have therefore been left untouched, among them the problem of the formation of zymase in the cell and the vexed question of the relation of alcoholic fermentation to the metabolic processes of the higher plants and animals. The various chapters deal with zymase and its properties; the function of phosphates in alcoholic fermentation; the co-enzyme of yeast juice; carboxylose and carboligase; chemical changes involved in fermentation; inhibiting and accelerating agents; by-products of alcoholic fermentation and the mechanism of fermentation. There is a very extensive bibliography of nearly 40 pages.

* * *

IN preparing *Principles of Patent Law for the Chemical and Metallurgical Industries,* by Anthony William Deller (Chemical Catalog Co., Inc., New York, pp. 483, price $6.00), the author has attempted to satisfy the long felt want for an informative book on American patent law for those associated with the chemical and metallurgical industries and to explain complex legal doctrines of patent law in terms of chemistry and metallurgy. Throughout the book the most authoritative decisions have been cited, and for the presentation of a complete picture of some of the well-known pioneer patents, occasional reference has been made to some of the early English decisions. The constant aim of the author has been to provide a working basis for the chemist or metallurgist to use in handling patent matters. To accomplish this aim, frequent repetition has been made of outstanding principles and doctrines of patent law and of leading cases and decisions.

News from the Allied Industries

Ceramic Industry

THE INDIAN INDUSTRIES DEPARTMENT has recently surveyed the possibilities of the ceramic industry in eight districts of the Madras Presidency. It has been ascertained that valuable deposits of china clay occur in Trichinopoly and Cuddappah districts, while white clay and impurities and felspar are reported to occur in Bellary and Kurnool districts. Pegmatite, a variety of felspar of very good quality, is available in very large quantities in Nellore district. The raw materials required for the manufacture of porcelain and other ceramic goods such as stoneware jars, drainage pipes, electric insulators, are also available in the districts so far surveyed.

Sugar Industry

IN ITS FIRST REPORT the Select Committee on Public Accounts states it sees no objection to the provision by excess votes of the sums required to cover the excess of expenditure over estimate on the beet sugar subsidy and on public buildings (overseas) in the year ended March 31, 1931. In the case of the beet sugar subsidy the excess to be voted is stated at £22,972. The committee was informed this was due to an under-estimate by the factories of their outputs and subsidy requirements owing to prolongation of the manufacturing season, and an unexpectedly large sugar content of beet. The Ministry of Agriculture states it did not become aware of these facts in time to permit of amendment of the supplementary estimate, but the committee learned the Treasury was informed early in March than an excess would probably be incurred, and that it decided, in view of the pressure on Parliamentary time and the uncertainty of the amount, if any, required, not to present a further supplementary estimate.

Vegetable Oils

VEGETABLE OILS to the value of $17,000,000 are at present consumed yearly in Canadian industry, and of this amount importations from the United States and the United Kingdom are valued at $11,500,000. Linseed oil is the only vegetable oil made in Canada from domestic raw material, and there is no better grade obtained elsewhere. Production in 1930 was 5,129,000 gallons, valued at $5,154,000. The only other other vegetable oil of primary importance produced in Canada is cotton seed oil, but this is derived from imported raw material. Although soya beans have been successfully grown for many years in Ontario no mills have yet been erected for the expression of the oil. Vegetable oils are used in Canada for a variety of purposes, the most important being the manufacture of paints, varnishes, soaps and canned fish; also used to some extent for edible purposes, such as the making of salads and mayonnaise. The principal imported oils are cotton seed, peanut, cocoanut, chinawood, olive and soya beans.

Fertilisers

THE ANNUAL REPORT of Commonwealth Fertilisers and Chemicals (Ltd.), Victoria and South Australia, shows during the past year a net profit of £15,853 earned, compared with £102,621 last year. By transferring £25,000 from reserves, the company was able to pay a dividend of 5 per cent. on the 7 per cent. preference shares. The Commonwealth company represents an amalgamation of Cuming, Smith and Co. Pty. (Ltd.), Mount Lyell Mining and Railway Co. (Ltd.), Wischer and Co. Pty. (Ltd.) and Nobel (Australasia) (Ltd.). Bad debts have been written off and provision made for doubtful ones. The company has increased its cash resources by £87,000.

A CIRCULAR LETTER HAS BEEN ADDRESSED by the United Potash Co., Ltd., to farmers and secretaries of branches of the National Farmers' Union asking them to support a demand for the exemption of potash fertilisers under the new Imports Duties Bill. The letter states that no country in the world which has to import potash imposes a duty upon it, since it is considered to be an essential raw material in the production of food. Practically no potash is produced in this country, and only insignificant quantities at present come from within the Empire. Unless potash fertilisers are exempted from duty the price is therefore expected to rise by the amount of the duty.

Tanning

RESEARCHES ARE NOW IN PROGRESS in Bengal in the Government Tanning Institute on tanning processes for improving the quality of local production with a view to attaining western standards and to inaugurate the manufacture of new varieties of leather not hitherto made in India. A second group of researches is being directed to chemical methods for controlling tanning operations and on treatment materials required in tanning. Cattle hides from different parts of the province and of different cures are being chrome tanned and finished into box leather with the object of disclosing and removing their several defects. A number of investigations are also in progress on the various processes of manufacture. The strong sulphide liming process was given an extensive trial, and the process has been found very effective in eliminating loose grain. Means for preventing a serious defect in Indian leather has thus been discovered. A process has also been worked for the production of a suitable sole leather, whilst some experiments have been carried out on the production of chamois leather from sheep skins.

Iron and Steel

A MONTH AGO IT WAS ANNOUNCED that developments were taking place in the business of the National Smelting Co., Ltd., at Avonmouth Docks, and since then two of the furnaces, which have been lying idle for some time have been restarted and about fifty men have found employment. A further phase in the development is indicated in the movements of the Bristol Channel steamer *Brompton Manor* which is to load at Huelve (Spain) towards the end of the month with a full cargo of pyrites for discharge at the Avonmouth Docks. This will be the first cargo of its kind handled at Avonmouth, and represents also the first direct shipment on account of the company.

IN A RECENT INTERVIEW to *The Financial News* Mr. Ronald Wild, inventor of the Wild process for the manufacture of stainless iron and steel, and a director of the Darlington Rustless Steel and Iron Co., stated that the old process for manufacturing stainless iron and steel by the addition of ferrochromium to low carbon iron in a molten state involves two furnace operations, and results in a product which, though admirable in many ways, is not of even composition and is not of wide application. The Wild process in one furnace operation produces a stainless iron of much greater homogeneity at a substantially lower cost. It is hoped that the Wild process will reduce costs sufficiently to open up a considerable "heavy" market. The Darlington plant is now only capable of an output of some 6,000 tons a year.

Coke Oven By-products

AN INTERESTING EXPERIMENT was recently carried out by the L.N.E.R. at Tyne Dock to test the possibility of shipping liquid tar direct from railway tank wagons into tank steamers by gravity. In order to gain the necessary height it was decided to ship from one of the jetties normally used for coal, the point chosen giving a height of about 30 feet above water level. A small "catchment" or open steel tank was constructed and placed below the level of the decking which covers the top of the jetty with an outlet at the bottom leading into the flexible pipe which in turn leads into the steamers' tanks. On each side of the "catchment," troughs were laid in between the rails, rather similar to water troughs for taking up water on main lines, and inclined downwards towards the "catchment." The tar was brought from the works in railway tank wagons, having been heated previously to a sufficient temperature to keep it hot and liquid for some hours. Three wagons at a time were placed over the troughs and the cocks beneath the wagons opened when it was found that the tar flowed easily down the troughs into the "catchment" and so through the pipe into the steamers. About 350 tons were loaded in 8½ hours actual working time on the first occasion, but it is now the intention of the company to increase the length of the troughs and empty more wagons simultaneously. The outstanding advantage of this method of shipment is that no pumps are required and it is not necessary to couple each tank separately to the outlet pipe which is a tedious operation.

Letters to the Editor

The Editor welcomes expression of opinion and fact from responsible persons for publication in these columns. Signed letters are, of course, preferred, but where a desire for anonymity is indicated this will invariably be respected. From time to time letters containing useful ideas and suggestions have been received, signed with a nom-de-plume and giving no information as to their origin. Correspondence cannot be published in THE CHEMICAL AGE *unless its authorship is revealed to the Editor.*

Influence of Clean Coal

To the Editor of THE CHEMICAL AGE.

SIR,—In your issue of February 13 is a reference to some remarks I made at a recent meeting of the Oil Industries Club. From your note it would appear that there is a little misunderstanding. When speaking of the possible influence of clean coal in future developments I wished to state that the credit for the examination of the British coal seams in respect of clean coal contents and many other factors belongs to the Fuel Research Division of the Department of Scientific and Industrial Research. The actual commercial carrying out of the operation of reducing coal to a state of high degree of purity stands, I believe, to the credit of Dr. Lessing, and I should be glad if you would give credit where it is due.—Yours faithfully,

W. R. ORMANDY.

18 Belsize Grove,
Belsize Park, N.W.3.

Foreign Marketing

To the Editor of THE CHEMICAL AGE.

SIR,—Your editorial note on "Foreign Marketing," commenting on the attitude of some British firms to foreign trade, prompts me to describe an experience of that kind, which occurred when I was reorganising a large factory in the Balkans not very long ago. It was found necessary to buy certain additional machinery and, as the policy of the company was to buy British goods wherever possible, even at a somewhat higher price, two British firms were asked to quote, in addition to the Continental firms that had previously supplied this machinery. A very definite specification was sent with the inquiries and it was pointed out that local conditions required strict adherence to this specification. Both firms sent in tenders for machines, which bore very little relation to the specification and which were quite unusable for the purpose. One firm stated that the machine they offered had been supplied to many parts of the world and had proved very suitable and would no doubt suit us equally well.

As the order was a fairly important one, I decided that when I was next in London I would take the matter up with these firms. The experience in both cases was very similar. In the first place I asked the firm's London representative, through whom the tender had come, to call on me. He was unable to explain the discrepancy between the tender and the specification so I suggested that someone from the works should come up to London to discuss the matter. A few days later I had a meeting with the works manager and chief designer. After they had explained to me that it was quite impossible to construct a satisfactory machine to our specification, I pointed out that machines of that type had been in use at our factory and at other factories for several years and had proved very satisfactory. I also pointed out that tenders to our specification had been received from three well-known Continental firms, who had previously supplied these machines and were quite willing to do so again. After a long explanation of the local conditions which necessitated our specification, they agreed to send in a proper tender, which I received in due course. It is fairly obvious that firms which require such an effort on the part of the buyer, and which assume that they know what is wanted better than the buyer himself, are not likely to find their foreign trade expanding rapidly.

Another example which is perhaps worth mentioning occurred when we wanted certain equipment and asked for catalogues from two British firms and one German firm that were specialists in this line. Both British firms were expressly asked to send their catalogues in German so that I could give them to my engineer to study in detail. Both British firms sent catalogues in English, one of them also enclosing a leaflet in German, extolling the merits of their products but giving no technical information. The German firm, in addition to sending detailed and informative literature, wrote that their local agent would call on us in a few days and that they were sending at the same time an engineer from their office in Vienna (a journey of 24 to 40 hours). The engineer in question had had a thorough theoretical and practical training in the particular field and was able to make many useful suggestions as a result of his experience. He spent nearly two days at our works to learn exactly what our requirements were and a few days later we received a detailed quotation from the German firm. As I was not able on this occasion to make a special visit to England to instruct the British firms how to do their selling, the German firm received the order, which was quite a substantial one.—Yours faithfully,

A. J. V. UNDERWOOD.

14 Victoria Street,
London, S.W.1.

"Why Not British?"

To the Editor of THE CHEMICAL AGE.

SIR,—With reference to the letter signed "Buy British" in your issue of February 20, regarding the recent showing of a Continental film demonstrating the use of creosote and complaining that no similar British film has been made, may I draw your attention to the film of the British Wood Preserving Association, which has been shown on various occasions in different parts of Great Britain during the past two years?

This film was specially designed to show scenes of British forestry and the work of the Forest Products Laboratory at Princes Risborough. Scenes are also shown of the creosoting of telegraph poles for H.M. Post Office, and the preparation of sleepers in the yards of the London and North Eastern Railway Company.

The idea of producing a creosote film on the Continent first occurred to the Continental Committee when the film produced by the British Wood Preserving Association was shown at Amsterdam, by me, in October, 1930.—Yours faithfully,

HENRY DOBINSON,
General Manager, National Creosote Committee, and Chairman, Film Committee, British Wood Preserving Association.

166 Piccadilly, W.1.

[At Mr. Dobinson's request, we submitted a copy of his letter to our correspondent, "Buy British," in order that his reply might be published simultaneously with Mr. Dobinson's letter.—Ed. "C.A."]

To the Editor of THE CHEMICAL AGE.

SIR,—I appreciate your courtesy in forwarding me a copy of Mr. Dobinson's letter defending his Association against my criticism of the exhibition of a foreign film to boost a British industry, and I hasten to congratulate him upon the completeness and effectiveness of his answer to that criticism. There are many people in the coal tar by-products trade, of whom I am one, who have not yet seen the British Wood Preserving Association film, and I cannot help feeling that if my letter has done nothing else, it has served a useful purpose in affording Mr. Dobinson an opportunity of telling us something we did not all know—that it was the British film, shown by Mr. Dobinson himself on the Continent, that put the idea into the heads of the Continental producers to enlist the aid of the screen in their creosote propaganda. Since I offered my criticism, I have learned that the film of the British Wood Preserving Association is a really excellent piece of advertising, and I shall certainly look forward to its next showing.—Yours faithfully,

"BUY BRITISH."

From Week to Week

THE MOND NICKEL CO., LTD., is transferring its head office to Thames House, Millbank, S.W.1, as from March 7. The telephone number will be Victoria 5353.

WE ARE INFORMED by the Royal Society that the selection of candidates for election to membership will be made on March 3. The names given in these columns last week are included in the preliminary list, but their inclusion does not necessarily indicate that they will be in the final selection.

THE 2,000-TON CONSIGNMENT OF SULPHUR from Arica (Chile) to Europe, reported unofficially during November, is believed to have resulted from the drop in value of the pound sterling. When the latter returns to its normal level it is not expected that Chilean sulphur can compete in the world markets.

AMONG THE NAMES IN THE LIST of candidates recommended for election as Fellows of the Royal Society of Edinburgh on March 7 are:—Andrew Hunter, M.D., F.R.S.C., professor of biochemistry in the University of Glasgow, and Thomas Slater Price, D.Sc., F.R.S., professor of chemistry at the Heriot-Watt College, Edinburgh.

THE UNIVERSITY OF MANCHESTER has received notice of bequests under the will of Mrs. Kate Greatorex, formerly of Mytton Hall, near Shrewsbury. The testator has bequeathed £5,000 to found scholarships to be known as the Edmund Travis Scholarships in the Engineering Department; £3,000 to found scholarships to be known as the Joseph Travis Scholarships for Applied and Organic Chemistry.

RECENT WILLS include:—William Hamilton Stewart MacDonald, of Busby House, Busby, near Glasgow, formerly of 49 Octavia Crescent, Greenock, chemical manufacturer, of 189 St. Vincent Street, Glasgow (personal estate) £36,119; Thomas Simpson, of Hepscott, Northumberland, chairman of Wilkinson and Simpson, Ltd., manufacturing chemists £44,682 (net personalty £22,398); Samuel Stewart, retired analytical chemist, 12 Montgomery Street, Kirkcaldy, who died in November, £3,444; William Stuart Turnbull, manufacturing chemist, Gareloch, Dunbartonshire, £13,234.

ACCORDING TO THE CURRENT ISSUE of the *Ministry of Labour Gazette*, unemployment in the chemical and allied trades in Great Britain and Northern Ireland on January 25 was as follows:—Chemicals, wholly unemployed 16,821 (temporary stoppages 1,447); explosives, wholly unemployed 1,807 (temporary stoppages 317); paint, varnish, red and white leads, wholly unemployed 2,154 (temporary stoppages 211); oil, glue, soap, ink and matches, wholly unemployed 8,810 (temporary stoppages 1,691); coke ovens and by-products works, wholly unemployed 3,245 (temporary stoppages 432).

DR. J. G. DAVIDSON has been elected vice-president of the Carbide and Carbon Chemicals Corporation, New York. Dr. Davidson served the Corporation as director of chemical sales during the period 1923-30 and later, during 1930-1, as general sales manager. He served as instructor in chemistry at Los Angeles Junior College during 1914-16, and in 1917 was given a fellowship at Columbia University. In 1918 Columbit conferred on him the degree of Ph.D. and shortly afterwards he become an industrial fellow and later a senior fellow of the Mellon Institute, a post that he occupied with conspicuous success until he entered the employ of the donor of his fellowship, the Carbide and Carbon Chemicals Corporation. During his work at Columbia and later at Mellon Institute Dr. Davidson specialised in hydrocarbon chemistry.

THE UNIVERSITY OF EDINBURGH, on the recommendation of their Faculty of Medicine, has awarded the Cameron Prize for 1932 to Professor Edward Mellanby, F.R.S., professor of pharmacology in the University of Sheffield. The Cameron Prize, which is of the value of about £200, is awarded annually "to a person who, in the course of the five years immediately preceding, has made any highly important and valuable addition to practical therapeutics." The first recipient of the prize was Louis Pasteur in 1889. The second, in 1890, was Lord Lister, who introduced the antiseptic treatment in surgery. Professor Mellanby, who has made many valuable contribution on the subject of food vitamins, last year delivered the Hastings Popular Lecture of the British Medical Association.

THE BRITISH LEATHER MANUFACTURERS' RESEARCH ASSOCIATION has changed its address from No. 26 to No. 8 St. Thomas' Street, London, S.E.1.

SHAWINIGAN, LTD., are occupying Stand No. B.120 at Olympia Section of the British Industries Fair, and not Stand No. B.96 as stated in last week's issue of THE CHEMICAL AGE (page 161). The source of this error was our copy of the official B.I.F. catalogue.

THE ELEVENTH CONFERENCE of the Union Internationale de Chimie, which was to have followed the International Congress of Pure and Applied Chemistry at Madrid in April next, has, in consequence of the postponement of the Congress, also been indefinitely postponed.

THOMPSON BROS. (BILSTON), LTD., Bradley Engineering Works, Bilston, desire us to point out that in their welded tanks and steel fabricated work they have in the past and still continue to use British made steel. The firm is British owned and British controlled, employing British workmen.

THE EMPLOYEES OF THE CHROME CORPORATION of South Africa have received notices terminating their engagements. It was announced recently that an English company, African Chrome Mines, Ltd., acquired a controlling interest in this company.

THE LATVIAN MINISTRY OF FINANCE has now completed the Bill for the Government monopoly of naphtha products. This measure will entitle only the Ministry to import kerosene and petrol, thus paralysing the activities of the Shell and other oil companies. Latvia imports annually 6,000 tons of petrol and 17,00 tons of kerosene, the bulk of which comes from the Shell Co, and the balance from the Soviet Republic and the United States.

THE INDUSTRIAL LIQUEFACTION of gases was the subject of a paper read before the Royal Society of Arts, at Edinburgh, on February 22. The author was Mr. C. R. Houseman, of the British Oxygen Co., Ltd., Wembley. The paper was concerned with the processes of the British Oxygen Co. for obtaining from the atmosphere oxygen, nitrogen, and the rare gases argon, helium, and neon, for all of which there is now a considerable commercial demand.

THE APPOINTMENTS OF Professor S. M. Dixon, Professor J. S. Haldane and Professor C. H. Lees in the Fuel Research section of the Department of Scientific and Industrial Research would normally have ended on December 31, 1931, under the scheme of retirement in rotation. At the request of the Secretary for Mines they have accepted special extensions of their terms of office for specified periods in the interests of the board's work. Mr. G. F. Anderson has been appointed secretary to the board, vice Mr. D. B. Woodburn.

SCIENTISTS ARE NOT UNANIMOUS in their views regarding the theory that cattle in Northumberland have been poisoned by emanations from coke ovens. In a paper by Dr. J. T. Dunn, the Newcastle City Analyst, and Mr. Bloxham, read before the Newcastle Section of the Society of Chemical Industry at Armstrong College, it was stated that they had investigated several cases of the death of livestock which had pastured in fields adjoining coke ovens, and they concluded that the animals had died by lead and copper poisoning which had originally emanated from coke ovens. Professor Henry Louis, emeritus professor of Mining at Armstrong College, however, did not uphold this theory.

Obituary

MR. JOHN HUGH JEFFREY, A.I.C., of Daysbrook Road, Streatham Hill, S.W., at Margate, aged 44.

MR. WILLIAM DAVID DYE, D.Sc., F.R.S., third son of Alderman Charles Dye, J.P., of Portsmouth, at Surbiton, aged 44.

MR. WERNER STAUFFACHER, chairman of the Sandoz Chemical Co., Ltd., following a motor accident at Basle, Switzerland, aged 64. Mr. Stauffacher was managing director of the Sandoz Chemical Works at Basle, president of the Society for the Navigation of the Rhine, president of the Swiss Society for Economics and delegate of the Swiss Federal and Swiss National Banks.

Weekly Prices of British Chemical Products

The following notes on the chemical market conditions in Great Britain are based on direct information supplied by the British manufacturers concerned, and unless otherwise qualified the figures quoted apply to fair quantities, net and naked at makers' works. Where no locality is indicated, the prices are general for the United Kingdom. Particulars of the London chemical market are specially supplied to THE CHEMICAL AGE *by R. W. Greeff and Co., Ltd., and Chas. Page and Co., Ltd., and those of the Scottish chemical market are specially supplied by Chas. Tennant and Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

CHEMICAL market conditions in London continue firm, with the prices of a number of products tending to advance. Demand has been quite brisk, and a large amount of business has been placed. Home produced arsenic is unobtainable for the time being, and the price is nominal. The market for coal tar products remains quiet, and prices are unaltered from last week. In Scotland, business generally has been dull for the past week. This is attributed to buying commitments in view of the tariffs which are now almost certain to operate from March 1.

General Heavy Chemicals

ACETONE.—LONDON: £65 to £68 per ton; SCOTLAND: £66 to £68 ex wharf, according to quantity.

ACID, ACETIC.—Tech. 40%, £19 15s. per ton d/d address U.K. in casks. LONDON: Tech. 80%, £37 5s. to £39 5s.; pure 80%, £38 5s. to £40 5s.; SCOTLAND: Glacial 98/100%, £48 to £59; pure 80%, £38 5s.; technical 80%, £37 5s. d/d buyers' premises Great Britain.

ACID, BORIC.—SCOTLAND: Granulated commercial, £26 10s. per ton; B.P. crystals, £35 10s.; B.P. powder, £36 10s. in 1-cwt. bags d/d free Great Britain in one-ton lots upwards.

ACID, CHROMIC.—11d. per lb., less 2½% d/d U.K.

ACID, CITRIC.—LONDON: 1s. 1d. to 1s. 2d. per lb., less 5%. *1s. 1d. per lb.

ACID, FORMIC.—LONDON: £51 to £52 per ton.

ACID, HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, NITRIC.—80° Tw. spot, £20 to £25 per ton makers' works, according to district and quality. SCOTLAND: 80°, £23 ex station full truck loads.

ACID, OXALIC.—LONDON: £50 per ton in casks, £51 10s. in kegs. SCOTLAND: 98/100%, £50 to £53 ex store.

ACID, SULPHURIC.—Average prices f.o.r. British makers' works, with slight variations owing to local considerations: 140° Tw. crude acid, £3 per ton; 168° Tw. arsenical £5 10s.; 168° Tw. non-arsenical, £6 15s. SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—LONDON: 1s. 2d. per lb., less 5%. SCOTLAND: B.P. crystals, 1s. 1¼d. to 1s. 1½d. less 5% carriage paid.

ALUM.—SCOTLAND: Lump potash, £9 per ton ex store.

ALUMINA SULPHATE.—LONDON: £8 15s. to £9 10s. per ton according to quality and quantity. *£8 10s. SCOTLAND: £8 to £8 10s. ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10s. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb. d/d, according to quantity.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £36 per ton; powdered, £38, packed in 5-cwt. casks d/d U.K. stations or f.o.b. U.K. ports.

AMMONIUM CHLORIDE.—£37 to £45 per ton, carriage paid. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton, carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

ANTIMONY OXIDE.—SCOTLAND: Spot £29 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden 6½d. to 1s. 1½d. per lb.; crimson, 1s. 4d. to 1s. 6d. per lb. according to quality.

ARSENIC.—LONDON: £24 10s. c.i.f. main U.K. ports for imported material. SCOTLAND: White powdered £27 ex wharf; spot, £28 10s. ex store.

ARSENIC SULPHIDE.—Yellow 1s. 6d. to 1s. 8d. per lb.

BARYTES.—£7 10s. to £9 per ton according to quality.

BARIUM CHLORIDE.—LONDON: £11 10s. per ton. SCOTLAND: £11 5s. in casks, ex store.

BISULPHIDE OF LIME.—£7 10s. per ton f.o.r. London, packages free.

BLEACHING POWDER.—Spot 35/37% £7 10s. per ton d/d station in casks, special terms for contract. SCOTLAND: £8 15s. in 5s. 6d. cwt. casks.

BORAX, COMMERCIAL.—Granulated £15 10s. per ton, powder £17, packed in 1-cwt. bags, carriage paid any station Great Britain. Prices are for 1-ton lots and upwards.

CADMIUM SULPHIDE.—3s. 6d. to 3s. 9d. per lb.

CALCIUM CHLORIDE.—Solid 70/75% spot £5 5s. to £5 15s. per ton d/d station in drums. SCOTLAND: £5 5s. to £5 15s., according to quantity and point of delivery.

CARBON BISULPHIDE.—£30 to £32 per ton, drums extra.

CARBON BLACK.—4d. to 5d. per lb. ex wharf.

CARBON TETRACHLORIDE.—£45 to £55 per ton, drums extra.

CHROMIUM OXIDE.—10d. to 10½d. per lb. according to quantity d/d U.K. Green 1s. 2d. per lb.

CHROMETAN.—Crystals 3¾d. per lb. Liquor £19 10s. per ton d/d U.K.

COPPERAS GREEN.—SCOTLAND: £3 15s. per ton, f.o.r., or ex works.

CREAM OF TARTAR.—LONDON: £5 3s. 6d. to £5 5s. per cwt.

DIPHENYLGUANIDINE.—2s. 6d. per lb.

FORMALDEHYDE.—LONDON: 28s. 6d. to 30s. per cwt. SCOTLAND: 40%, £28 per ton ex store.

HYDROGEN PEROXIDE.—LONDON: *100 vols. 10d. per lb.

INDIARUBBER SUBSTITUTES.—White, 4d. to 5½d. per lb.; Dark, 4d. to 4½d.

LAMPBLACK.—£46 to £50 per ton.

LEAD ACETATE.—LONDON: White £42 to £44 per ton. Brown £1 per ton less. *£43 and £42 respectively ex wharf London. SCOTLAND: White Crystals £42 to £44 c.i.f. U.K. ports. Brown £1 per ton less.

LEAD, RED.—SCOTLAND: £30 per ton d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £40 per ton carriage paid.

LITHOPONE.—30%, £20 to £22 per ton. LONDON: £30.

MAGNESITE.—SCOTLAND: Ground Calcined £9 per ton ex store.

METHYLATED SPIRIT.—61 O.P. Industrial 1s. 8d. to 2s. 3d. gal. Pyridinised Industrial, 1s. 10d. to 2s. 5d. Mineralised, 2s. 9d. to 3s. 3d. 64 O.P. 1d. extra in all cases. Prices according to quantities. SCOTLAND: Industrial quality 64 O.P., 1s. 8d. to 2s. 3d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

NICKEL SULPHATE.—£38 per ton d/d.

PIPERIDINE RUBBER ACCELERATORS.—P.P.D., 10s. 6d. to 11s. 6d.; Z.P.D., 7s. to 7s. 6d.; L.P.D., 6s. 6d. to 7s.; P.T.D., 9s. 8d. to 10s. 4d.; C.P.D., 8s. 3d. to 8s. 10d. S.P.D., 8s. 1d. to 8s. 7d. Superac Standard 7s. Superac Z 3s. 6d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. net d/d U.K. Discount according to quality. Ground, 5¾d. LONDON: 5d. per lb. with usual discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports with allowance for contracts.

POTASSIUM CARBONATE.—SCOTLAND: 96/98% spot £28 per ton ex store.

POTASSIUM CHLORATE.—3¾d. per lb. export London in 1-cwt. kegs. LONDON: £33 to £35 per ton. SCOTLAND: 99¾/100% powder £34.

POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.

POTASSIUM NITRATE.—SCOTLAND: Refined Granulated £28 per ton c.i.f U.K. ports. Spot £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 8½d. per lb. SCOTLAND: B.P. crystals, 8½d.

POTASSIUM PRUSSIATE.—LONDON: 8½d. per lb. SCOTLAND: Yellow spot material, 8½d. ex store.

SALAMMONIAC.—First lump spot, £42 17s. 6d. per ton d/d address in barrels.

SODA ASH.—58% spot, £6 per ton f.o.r. in bags, special terms for contracts.

SODA, CAUSTIC.—Solid 76/77° spot £14 10s. per ton d/d station. SCOTLAND: Powdered 98/99% £17 10s. in drums, £18 15s. in casks. Solid 76/77% £14 10s. in drums. 70/72% £14 12s. 6d. carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less.

SODA CRYSTALS.—Spot £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—97/98%, £21 per ton; LONDON: £22 to £23.

SODIUM BICARBONATE.—Refined spot £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 10s. ex quay or station.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount according to quantity. Anhydrous 5d. per lb. LONDON: 4d. per lb. with usual discounts for contracts. SCOTLAND: 4d. delivered buyer's premises with concession for contracts.

SODIUM BISULPHITE POWDER.—60/62%, £16 10s. per ton d/d 1-cwt. iron drums for home trade.

SODIUM CARBONATE (SODA CRYSTALS).—SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality 7s. 6d. per ton extra. Light Soda Ash £7 ex quay, min. 4-ton lots with reductions for contracts.

* Prices quoted by other manufacturers.

SODIUM CHLORATE.—2¾d. per lb. LONDON: £30 per ton. *£29 10s. per ton.
SODIUM CHROMATE.—3⅝d. per lb. d/d U.K.
SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals £15 ex station 4-ton lots.
SODIUM NITRITE.—Spot £19 to £22 per ton d/d station in drums.
SODIUM PERBORATE.—LONDON: 10d. per lb.
SODIUM PHOSPHATE.—£13 to £15 per ton f.o.r. London casks free. LONDON: Dibasic, £13 per ton.
SODIUM PRUSSIATE.—LONDON: 5d. to 5¾d. per ton. SCOTLAND: 5d. to 5¾d. ex store.
SODIUM SILICATE.—140° Tw. Spot £8 5s. per ton d/d station returnable drums.
SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d. SCOTLAND: English material £3 15s.
SODIUM SULPHATE (SALT CAKE).—Unground Spot £3 15s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d.
SODIUM SULPHIDE.—Solid 60/62% Spot £10 15s. per ton d/d in drums. Crystals Spot £7 15s. per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 2s. 6d. d/d buyer's works on contract, min. 4-ton lots. Spot solid 5s. per ton extra. Crystals, 2s. 6d. per ton extra.
SODIUM SULPHITE.—Pea crystals spot, £13 10s. per ton d/d station in kegs. Commercial spot £9 10s. d/d station in bags.
SULPHUR.—£12 5s. to £15 15s. per ton. SCOTLAND: Flowers, £12 10s.; roll, £12 10s.; rock, £9. Ground American, £12 ex store.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.
SULPHUR PRECIP.—B.P. £55 to £60 per ton according to quantity. Commercial, £50 to £55.
VERMILION.—Pale or deep, 6s. 8d. to 6s. 10d. per lb.
ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.
ZINC SULPHATE.—LONDON: £12 per ton. SCOTLAND: £12 per ton.
ZINC SULPHIDE.—1s. to 1s. 2d. per lb.

Pharmaceutical and Photographic Chemicals

THE following changes are reported in the markets for pharmaceutical and photographic chemicals:—
ACID, TANNIC, B.P.—2s. 11d. to 3s. 4d. per lb.
POTASSIUM IODIDE, B.P.— 18s. 4d. to 21s. 4d. per lb.
SODIUM IODIDE, B.P.—10s. 10d. to 20s. 10d. per lb.
IODINE RESUB. B.P.—21s. 3d. to 22s. 6d. per lb.
IODOFORM B.P. CRYST., PRECIP., or POWDER.—24s. 5d. to 25s. 8d. per lb.
PARAFORMALDEHYDE.—1s. 3d. to 1s. 5d. per lb.

Coal Tar Products

ACID, CARBOLIC (CRYSTALS).—5½d. to 6¼d. per lb. Crude, 60's 1s. 4d. to 1s. 5d. per gal.
ACID, CRESYLIC.—99/100, 1s. 8d. to 1s. 9d. per gal.; B.P., 2s. 6d. to 3s.; Refined, 2s. to 2s. 2d; Pale, 98%, 1s. 7d. to 1s. 8d.; Dark, 1s. 4d. to 1s. 4½d. LONDON: 98/99%, 1s. 6d. Dark 95/97%, 1s. 4d.
BENZOL.—At works crude 7d. to 7½d. per gal. Standard motor, 1s. 2d. to 1s. 3d.; 90%, 1s. 3d. to 1s. 4d. Pure, 1s. 6d. to 1s. 7d. LONDON: Motor, 1s. 5½d.
CREOSOTE.—Standard for export, 4⅜d. to 5d. nett per gal. f.o.b. for Home, 3¼d. d/d. LONDON: 3d. to 3½d. f.o.r. North; 4d. to 4½d. London.
NAPHTHA.—Solvent, 90/160, 1s. 3d. per gal.; 95/160, 1s. 5d. to 1s. 6d. 90/190, 11d. to 1s. 2d. LONDON: Solvent, 1s. 1½d. to 1s. 2d.; heavy, 11d. to 1s. 0½d. f.o.r.
NAPHTHALENE.—Purified crystals, £11 10s. per ton in bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6.
PITCH.—Medium Soft, £4 to £4 5s. per ton in bulk at makers' works. LONDON: £3 15s. to £4 f.o.b. East Coast port.
PYRIDINE.—90/140, 4s. per gal.; 90/160, 4s. to 4s. 6d.; 90/180, 2s. to 2s. 6d.
TOLUOL.—90%, 2s. 4d. per gal.; Pure, 2s. 6d.
XYLOL.—2s. per gal.; Pure, 2s. 3d.

Intermediates and Dyes

IN the following list of Intermediates delivered prices include packages except where otherwise stated:—
ACID, BENZOIC, B.P. (ex Toluol).—1s. 9½d. per lb.
ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.
ACID H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.
ACID, NAPHTHIONIC.—1s. 2d. per lb. 100% d/d buyer's works.
ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100% d/d buyer's works.
ACID, SULPHANILIC.—Spot, 8¼d. per lb. 100% d/d buyer's works.
ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra, d/d buyer's works.
BENZIDINE BASE.—Spot, 2s. 5d. per lb. 100% d/d buyer's works.
o-CRESOL 30/31° C.—£2 6s. 5d. per cwt., in 1-ton lots.
m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.
p-CRESOL.—34.5° C.—1s. 9d. per lb., in ton lots.
DICHLORANILINE.—2s. 2d. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., packages extra, d/d buyer's works.
DINITROBENZENE.—8½d. per lb.
DINITROTOLUENE.—48/50° C., 8d. per lb.; 66/68° C., 8¾d. per lb.
DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.
a-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.
B-NAPHTHOL.—Spot, £75 per ton in 1 ton lots, d/d buyer's works.
a-NAPHTHYLAMINE.—Spot, 11½d. per lb., d/d buyer's works.
B-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.
o-NITRANILINE.—5s. 10d. per lb.
m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.
NITROBENZENE.—Spot, 6½d. per lb.; 5-cwt. lots, drums extra, d/d buyer's works.
NITRONAPHTHALENE.—8½d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb. 100% d/d buyer's works.
o-TOLUIDINE.—Spot, 9½d. per lb., drums extra, d/d buyer's works.
p-TOLUIDINE.—Spot, 1s. 9d. per lb., d/d buyer's works.
m-XYLIDINE ACETATE.—3s. 6d. per lb., 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £7 10s. per ton. Grey, £12 per ton. Liquor, 8d. to 9d. per gal.
ACETIC ACID, TECHNICAL, 40%.—£16 15s. to £17 15s. per ton.
ACETONE.—£63 to £65 per ton.
AMYL ACETATE, TECHNICAL.—90s. to 98s. per cwt.
CHARCOAL.—£6 10s. to £10 10s. per ton, according to grade and locality.
IRON LIQUOR.—24°/30° Tw., 10d. to 1s. 2d. per gal.
METHYL ACETONE.—40/50%.—£52 per ton.
RED LIQUOR.—16° Two., 8½d. to 10d. per gal.
WOOD CREOSOTE.—1s. to 2s. 6d. per gal., unrefined.
WOOD NAPHTHA, MISCIBLE.—3s. to 4s. per gal. Solvent, 3s. 9d. to 4s. 9d. per gal.
WOOD TAR.—£2 10s. to £6 per ton.
BROWN SUGAR OF LEAD.—£32 per ton.

Latest Oil Prices

LONDON, February 24.—LINSEED OIL was quiet. Spot, ex mill £19; March, £16 5s.; March-April, £16 7s. 6d.; May-August, £17 10s.; September-December, £18 10s., naked. RAPE OIL was steady. Crude extracted, £31; technical refined, £33, naked, ex wharf. COTTON OIL was steady. Egyptian, crude, £23 10s.; refined common edible, £27 10s.; deodorised, £29 10s.; naked, ex mill. TURPENTINE was firm. American, spot, 52s. 9d.; March-April, 53s. 3d. per cwt.

HULL.—LINSEED OIL.—Spot and February, £15 10s.; March-April at £16 5s.; May-August at £17 5s.; September-December at £18 7s. 6d. per ton, naked. COTTON OIL.—Egyptian, crude, spot, £23 10s.; edible refined, spot, £25 10s.; technical, spot, £25 10s.; deodorised, £27 10s. per ton, naked. PALM KERNEL OIL.—Crude, f.m.q., spot, £27 per ton, naked. GROUNDNUT OIL.—Crushed/extracted, spot, £39 10s.; deodorised, £43 10s. per ton. RAPE OIL.—Crushed/extracted, spot, £30; refined, £32 per ton. SOYA OIL.—Crushed/extracted, spot, £24 10s.; deodorised, £28 per ton. COD OIL, 16s. 6d. per cwt. CASTOR OIL.—Pharmacy, spot, 48s. 6d.; first, 43s. 6d.; second, 41s. 6d. per cwt. TURPENTINE. American, spot, 54s. 9d. per cwt.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—*Export.*—Price continues unchanged at £5 5s. per ton f.o.b. U.K. port in single bags. The demand in the importing markets appears to be satisfactory, but as supplies are plentiful prices remain steady. *Home.*—Buyers all over the country report a brisk demand for sulphate. The long spell of fine weather has resulted in much earlier deliveries than usual. Prices remain unchanged.

IMPORTED NITRATE OF SODA.—The demand is normally later than for sulphate of ammonia and up to the present reports concerning it give little indication of the amount of business done.

BRITISH NITRATE OF SODA.—Good sales were made when this product was put on the market and deliveries are now being effected. The price continues the same as the Chilean product.

NITRO-CHALK.—Deliveries of sales made earlier in the year are satisfactory and considerable further sales are being made daily.

* Prices quoted by other manufacturers.

South Wales By-Products

SOUTH Wales by-product activities continue to be on a restricted scale, the demand for most products being sporadic and moderate. There is no change in the pitch market, the call being small and confined to prompt delivery parcels. Stocks are well in excess of demands and there is no change in values. There is a slightly better call for road tar round 13s. per 40-gal. barrel delivered. Refined tars have a steady, if moderate, call, with quotations for coke oven and gasworks tar unchanged. Naphthas continue to have a dull market, solvent having a small, uncertain demand, while heavy has practically no demand. Motor benzol is a fairly strong feature, but creosote remains weak. Patent fuel and coke exports are unsatisfactory. Patent fuel quotations are:—19s. to 19s. 3d., ex-ship Cardiff; 18s. to 18s. 3d., ex-ship Swansea. Coke prices are:—Best foundry, 32s. 6d. to 30s. 6d.; good foundry, 22s. 6d. to 25s.; furnace, 17s. to 18s.

Scottish Coal Tar Products

PRICES of most products remain firm with supplies quite scarce. Refined tar is selling in fairly substantial quantities for both prompt and forward, but ordinary Cresylic continues dull.

CRESYLIC ACID.—Pale, 99/100 per cent., 1s. 3½d. to 1s. 4½d. per gal.; pale, 97/99 per cent., 1s. 1½d. to 1s. 2½d.; dark, 97/99 per cent., 1s. 0½d. to 1s. 1½d.; all f.o.r. makers' works. High boiling acid is now valued at 2s. 9d. to 3s. per gal.

CREOSOTE OIL.—Specification oils, 2¾d. to 3¼d. per gal.; washed oil, 3½d. to 3¾d.; gasworks ordinary, 3¾d. to 4d.; all f.o.r. makers' works in bulk.

COAL TAR PITCH.—Practically nothing is available in this district. Export value is nominal at 72s. 0d. to 77s. 6d. per ton f.o.b. Glasgow, while 75s. to 80s. per ton ex works is being obtained for wagon loads in the home market.

REFINED COAL TAR.—Inquiries are numerous and value is firmer at 4d. to 4¼d. per gal. ex works in buyers' packages.

WATER WHITE PRODUCTS.—Motor benzol, 1s. 3½d. to 1s. 4½d. per gal.; 90/160 Solvent, 1s. 2½d. to 1s. 3½d.; and 90/190 heavy solvent, 1s. 0½d. to 1s. 1½d.; all in bulk ex works.

Sacks for Chemical Products

AN improved type of paper sack for chemical products, so constructed as to obviate all the disadvantages that previously attended the use of paper sacks for such materials, has been produced and placed on the market by the Colthrop Board and Paper Mills, Ltd., of Larkfield, near Maidstone, Kent. About twelve months ago, the company realised that if the benefits of the use of paper sacks were to be extended to industry generally an entirely new type of sack must be evolved, and its research has resulted in the production of the sacks now being sold under the trade name "Crepesac." The "Crepesac" is capable of carrying safely any weight of any kind of material up to 2 cwt., and even over. It is soft and pliable to the touch and can be handled with the same facility as a jute sack. When tied up at the neck it can be slung in the same manner as a jute sack, and it has the added advantage that it can be sewn up in the usual way. Its use supersedes the use of jute sacks lined with paper, especially when the materials contained are of a deliquescent nature. "Crepesacs" can be supplied in any colour, the standard type being of the ordinary kraft brown paper colour, and when they are printed they provide the manufacturer with an excellent advertisement as well as a clean package. The new containers are made entirely of British material.

Anticipation of a New Substitute for Cork

A RECENT development concerning the production of cellulose esters containing higher fatty acid radicals of exceptionally high molecular weight which possess extraordinary resemblance to the suberine of natural cork is worthy of mention. It has already been suggested (Karrer, Peyer and Zega, *Helv. Chim. Acta*, 1922, 856, and Grün and Wittka, *Z. angew. Chem.*, 1921, 1,645) that cork partly consists of cellulose derivatives of this character. Ger. Pat. 513,061 involves the reaction of cellulose or cellulose derivatives containing free hydroxyl groups with a chloride of an estolidic acid (e.g., triricinoleic acid) in the presence of an acid binding agent such as a tertiary organic base. Cellulose esters of this type contain a much lower cellulose content than any previously known, the triester of ricinoleic acid having a cellulose content of 16.2 per cent. Esterification with estolidic acids of still higher molecular weight leads to the formation of esters containing as little as 1.5-2 per cent. of cellulose.

Manchester Chemical Market

[FROM OUR OWN CORRESPONDENT.]

Manchester, February 24, 1932.

THE chemical market continues to afford some interest, largely in anticipation of the near approach of the application of the general tariff to imported materials. Although up to the present prices have not actually been affected except in odd instances, there is no doubt whatever as to the markedly firm tendency, and an early adjustment of quotations to meet the higher imported cost is looked for. A fair amount of buying interest in foreign chemicals has been shown of late and there has been an active call for deliveries against old contracts. In other respects the market during the past week has not been particularly encouraging, for new buying from home consumers of many of the leading lines has only been moderate, although delivery specifications in most instances have been fairly satisfactory.

Heavy Chemicals

There has been a quietly steady movement of phosphate of soda, with current offers of the dibasic quality at about £13 per ton. Caustic soda is moving off in fair quantities against contracts and quotations are well held at £12 15s. to £14 per ton, in contracts and according to grade. Prussiate of soda is attracting a moderate amount of buying interest with prices quite firm at from about 5¼d. to 6¼d. per lb., according to quantity. There has been no special feature about the trade in saltcake this week, but values keep up at £3 2s. 6d. per ton. Sulphide of sodium has been rather a quiet section of the market, with the 60-62 per cent. concentrated solid material quoted at up to £11 10s. per ton and the commercial product at round £8 5s. Bichromate of soda is attracting fair attention and prices are well held on the basis of 4d. per lb., less 1 to 3½ per cent., in contracts, and 4d. per lb. net for spot lots. Bicarbonate of soda is a firm section at about £10 10s. per ton, with the demand on a moderate scale. Chlorate of soda is steady although the demand is only relatively quiet; current values are at round £30 per ton. Alkali keeps very firm at about £6 per ton, and fair deliveries are being called for. With regard to hyposulphite of soda, there is a quiet movement of this material, with prices maintained at about £9 5s. per ton for the commercial quality, with the photographic grade usually quoted at from £15 to £15 10s.

The potash products are firm generally and a fair amount of interest has been displayed in several items. Yellow prussiate of potash is quoted at from 8½d. per lb. and a moderate inquiry has been reported. Permanganate of potash has met with a quiet demand, with the commercial quality on offer at round 8d. per lb. and the B.P. at 8¾d. Bichromate of potash is in quietly steady request on the basis of 5d. per lb. in contracts up to the end of March. Caustic potash is very firm at from £38 to £39 per ton, as is also carbonate at round £31. In the case of chlorate of potash, there has been a moderate inquiry about for this material and at from £34 to £35 per ton prices are well held.

Sulphate of copper has perhaps been a little more active than of late with offers at about £18 10s. per ton, f.o.b. White powdered Cornish arsenic is firm although largely nominal on account of scarcity at £26 per ton, at the mines. The acetates of lime are steady at £8 per ton for the brown material and from £12 to £12 10s. for the grey, with a quiet business being put through. Buying interest in the lead products has not been particularly brisk but offers keep up at about £29 per ton for nitrate, with acetate at up to £40 per ton for the white grade and £38 for the brown.

Acids and Tar Products

Citric acid is displaying renewed firmness, and offers this week have been at 1s. 2d. to 1s. 2½d. per lb., with tartaric ranging from about 1s. 1¾d. to 1s. 2d. A moderate business is reported in the case of oxalic acid, which keeps firm at about £2 10s. per cwt., ex store. There has been no alteration in the price position of acetic acid, current values being at £39 5s. per ton for the 80 per cent. commercial quality and £52 for the technical glacial.

Offers of pitch for prompt shipment are being readily absorbed and quotations are very firm in consequence at from £3 15s. to £4 5s. per ton, f.o.b. Creosote oil is not too active, with offers at from 3½d. to 4¼d. per gallon.

Crepesac

ALL BRITISH

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Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2. at 1s. each.

Abstracts of Accepted Specifications

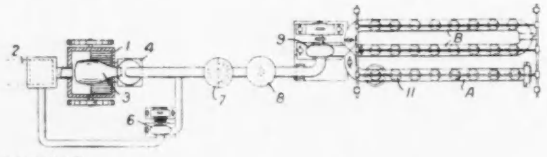
360,081. HYDROGEN AND CARBON MONOXIDE. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 11, 1930.

Methane or gas containing it is treated at 800°-1,000° C. with higher oxides of metals having specific gravity above 4.5, which are not reduced by hydrogen under the working conditions. The reduced oxide is reconverted into the higher oxide by treating with air, steam, or carbon dioxide, and pure nitrogen, hydrogen and carbon monoxide are obtained. Oxides of chromium, titanium, tungsten and molybdenum are suitable.

360,618. HYDROGEN AND NITROGEN. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, October 15, 1930.

Bituminous fuel is subjected successively to low-temperature carbonisation and gasification by blowing steam and air through it in superposed layers so as to keep it in vigorous motion. The hot gases obtained are then used for the low-temperature carbonisation. The gas mixture is condensed and the residual gas incompletely burnt with air or oxygen to convert the hydrocarbons to carbon monoxide, which is treated with steam in the presence of a catalyst to convert it into carbon dioxide and oxygen. A gas containing nitrogen is employed in one of the steps so that the final product is a mixture of nitrogen and hydrogen in the proportion required for the synthesis of ammonia. The apparatus is described.

360,746. ZINC OXIDE. Zinkhütte Neu-Erlaa Ges., Neu-Erlaa, Austria, International Convention date, January 21, 1930.



360,746

Zinc is vaporised in a retort 3 and oxidised in a chamber 4 by air which passes from the furnace flue 2, through the blower 6. The zinc oxide passes through the cooling chambers 7, 8 to an exhauster 9, and bag filters 11. The zinc oxide at first obtained, which is contaminated with cadmium oxide, is collected in filters A, and pure zinc oxide is then collected in filters B.

360,765. CALCIUM CARBIDE, CALCIUM CYANAMIDE AND PHOSPHORUS. N. Caro, 97 Hohenzollerdamm, Dahlem, Berlin, and A. R. Frank, 138 Kurfürstendamm, Halensee, Berlin. International Convention date, February 7, 1930.

Tertiary calcium phosphate is reduced with carbon to lime and phosphorus at 1,200°-1,600° C., or in presence of carbon monoxide up to 1,750° C. Calcium carbide is not formed under these circumstances, but is obtained free from phosphorus in a second stage under the usual temperature conditions, and can then be converted into calcium cyanamide.

360,830. DESTRUCTIVE HYDROGENATION. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-onMain, Germany. Application date, July 10, 1930.

Carbonaceous material is distilled in a hydrogen-containing gas which may be the waste gas from destructive hydrogenation, and may contain a mist of water, alcohol or benzines. A catalyst of molybdic acid, zinc oxide and magnesia may be employed.

360,890. STABILISED POLYSULPHIDE SOLUTIONS. J. C. Patrick, 201 Cadwalader Drive, Trenton, N.J., U.S.A. International Convention date, June 10, 1929.

A solution of an alkali or an alkaline earth hydroxide is mixed with sulphur and boiled for 15-20 hours under reflux, or in an autoclave, to obtain stable polysulphide solutions containing large proportions of sulphur.

361,004. HYDROCYANIC ACID AND ITS SALTS. J. Y. Johnson, London. From I. G Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 21, 1930.

A gaseous mixture containing ammonia, oxygen, and a hydrocarbon such as ethylene, ethane, methane, cyclo-aliphatic, or aromatic hydrocarbons, is passed over an oxidation catalyst at 700°-1,200° C. The catalyst may be platinum, iridium, rhodium, palladium, osmium, gold or silver, and oxides or phosphates of the rare earths. The reaction is exothermic. The products may be cooled to obtain hydrocyanic acid, or may be passed over alkali or alkaline earth metal oxides or hydroxides to obtain cyanides or cyanamides.

361,046. DESTRUCTIVE HYDROGENATION. Standard Oil Development Co., 100 West 10th Street, Wilmington, Del., U.S.A. Assignees of E. J. Gohr, 35, 5th Avenue, New York. International Convention date, Sept 19, 1929.

Heavy petroleum oil is destructively hydrogenated, and part of the oil is continually withdrawn to another reaction vessel, where it is treated with hydrogen at a lower temperature, to reduce its heavy asphaltic content and then returned to the hydrogenation zone for further hydrogenation. Catalysts may be employed, such as oxides or sulphides of molybdenum, chromium or other heavy metals, which may be suspended in the oil.

Specifications Accepted with Date of Application

366,472. Vat dyestuffs, Production of. R. Sedlmayr. October 27, 1930.

366,494. Methane into liquid hydrocarbons, Conversion of. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*) September 22, 1930.

366,547. Leaching phosphate rock, Process of. Kunstdunger Patent Verwertungs Akt.-Ges. October 5, 1929. Addition to 313,030.

366,549. Conversion of hydrocarbons into hydrocarbons lower in hydrogen-content at elevated temperatures. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*). September 29, 1930.

366,550. Artificial rubber-like masses, Manufacture of. A. Carpmael. (*I. G. Farbenindustrie Akt.-Ges.*) September 30, 1930.

366,553. Alcohols of high molecular weight, Recovery of—from waxes and the like by distillation. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*). October 2, 1930.

366,554. Vulcanization of rubber. Rubber Service Laboratories Co. May 28, 1930. Addition to 287,001.

366,580. Azo dyestuffs containing copper, Manufacture of. A. Carpmael. (*I. G. Farbenindustrie Akt.-Ges.*). November 6, 1930.

366,581. Derivatives of α-α-α -tribromethane, Manufacture of. A. Carpmael. (*I. G. Farbenindustrie Akt.-Ges.*). November 6, 1930.

366,600. 1 : 7-dihydroxynaphthalene, Manufacture of. A. Carpmael. (*I. G. Farbenindustrie Akt.-Ges.*). November 8, 1930.

366,635. Pure iron, Manufacture of. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*). November 27, 1930. Addition to 318,499 and 269,345.

366,654. Aluminium-silicon alloys. Aluminium, Ltd. January 30, 1930.

366,660. Vat-dyestuffs, Manufacture of. I. G. Farbenindustrie Akt.-Ges. December 17, 1929, and January 25, 1930. Additions to 313,887.

366,712. Naphthalene from gases, Process for removing. Vereinigte Stahlwerke Akt.-Ges. February 19, 1930.

366,727. Camphene, Production of. Rheinische Kampfer-Fabrik Ges. March 21, 1930.

366,737. Fertiliser mixtures, Production of. Kali-Forschungs-Anstalt Ges. February 21, 1930.

366,762. Chemical processes at elevated temperatures, Process for carrying out. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*). March 9, 1931.

366,808. Zinc oxide from the metal or materials containing same, Manufacture of. Compagnie Française de Transformation Metallurgique. April 15, 1930.

366,866. Decomposing calcium phosphate, Process for. I. G. Farbenindustrie Akt.-Ges. July 19, 1930.

RAYMOND EQUIPMENT

selected for 10 distinctly different purposes

The following recent orders for RAYMOND EQUIPMENT *emphasise the wide application to materials which are distinctly different*

For Separating HYDRATED LIME

For Grinding DI-CALCIUM PHOSPHATE

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For Grinding LEAD PIGMENTS

For Grinding CHLORIDE OF LIME

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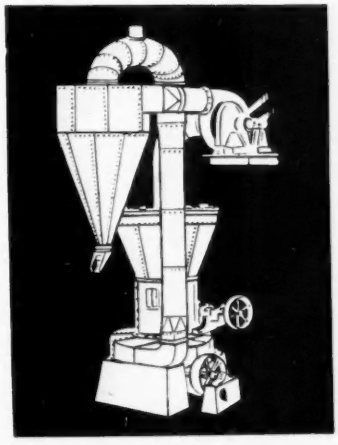

We are exhibiting a Raymond Roller Mill among other of our products at the BRITISH INDUSTRIES FAIR, BIRMINGHAM, STAND No. 22 C/1

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DUSTLESS GRINDING

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

Anderson, L. J., and Cash, W. A. Production of titanium oxide. 4588. February 16.

Bindley, W. T. R. Treatment of hydrocarbon materials and gases. 4590. February 16.

British Celanese, Ltd., Brown, F., Ellis, G. H. Dyestuffs. 4689. February 17.

—— Brown, F., Ellis, G. H. Manufacture &c. of dyestuffs. 4691, 4692, 4693 4694. February 17.

Distillers Co., Ltd., Dymock, J. B., Joshua, W. P., and Stanley, H. M. Manufacture of ethyl alcohol. 5068. February 19.

I. G. Farbenindustrie Akt.-Ges. Separation of unsaponifiable matter from fatty-acid materials. 4432. February 15. (Germany, April 18, '31.).

—— Manufacture of aldehyde-phenol condensation products. 5144. February 20. (Germany, March 7, '31.)

Imperial Chemical Industries, Ltd. Manufacture of aromatic aldehydes. 4505. February 15.

Johnson, J. Y. (*I. G. Farbenindustrie Akt.-Ges.*). Manufacture of liquid hydrocarbons. 4977. February 19.

Johnson, Matthey, and Co., Ltd. Electrolytic production of magnesium. 4762. February 17. (Germany, February 17, '31.)

—— Electrolytic production of magnesium. 4965. February 19. (Germany, February 19, '31.)

Kassler, R. Method of making chlorhydrins. 4816. February 18. (Czecho-Slovakia, February 18, '31.)

Koppers Co. of Delaware. Manufacture of ammonium sulphate. 5000. February 19. (United States, January 13.)

Lawarree, H. Manufacture of sodium bicarbonate. 4527. February 16. (Germany, February 16, '31.)

Morgan, G. T. Isolation of p-xylenol from phenolic mixtures. 4838. February 18.

Salerni, P. M. Carbonisation of carbonaceous materials. 4730. February 17.

Launch of the Benn Ninepenny Novels

Distinguished Authors at Luncheon

A GREAT gathering of notable people attended the launch, on Wednesday, of the Benn Ninepenny Novels, the latest publishing enterprise of Ernest Benn. Ltd. They were entertained at a luncheon at the Hotel Victoria, London, by Sir Ernest Benn and there met the leaders of modern fiction who are sharing in a great literary experiment.

SIR ERNEST BENN, in a brief speech in which he indicated the nature of this publishing enterprise, expressed personal pleasure that such a large gathering had assembled to honour the distinguished literary people who had the foresight and pluck in these days, when progress was so much talked about and so little in evidence, to do something that was really new. Six of the new ninepenny novels were to be published on February 25, six more on April 21, and then from June 2 it was believed they would be able to take advantage of the machinery of the periodical market and from that date publish one every Thursday.

Lord CECIL OF CHELWOOD, who voiced congratulations to the authors, confessed that although he had received an extensive education, most of the really important information he had acquired in his lifetime had been acquired through reading novels.

Viscountess SNOWDEN said she was looking forward, as one who believed in buying books to keep for her own shelves, to possessing every one of the delightful little books which were to be published in the Ninepenny Novels series.

The BISHOP OF LONDON, who added his word of praise, mentioned that he was the only person present who could claim to be a lineal descendant, though indirectly, of the author of perhaps the best seller in the world, "Pepys Diary." He said he was going to read all the ninepenny novels of the distinguished authors present that day, and they could think of him from 10.30 to 11.30 each evening, in his hour of relaxation, engaged in this pleasant pursuit.

Sir Nigel Playfair and Lord Burghley, M.P., also spoke and Mr. Walter Runciman, M.P., voiced the thanks of the guests to Sir Ernest Benn.

Points from Manufacturers' Literature

The Editor welcomes copies of new brochures and leaflets describing plant, equipment and products of interest to chemical manufacturers and the chemical using trades.

PROCESSES FOR RUST PROOFING IRON AND STEEL are the subject of a number of small leaflets issued by Rustproofing, Ltd., 11 Thames Street, Sunbury-on-Thames, who are the sole concessionaires of improved sheradising processes. Spray sheradising with zinc is quite distinctive from painting processes, inasmuch as it retains a metallic surface, which is electro-positive to the iron or steel and sets up a protective electrolytic couple, so that if the coating becomes penetrated or damaged the action of this couple still protects the iron from corrosion. Leadising, which consists in the application of a coating of lead to any desired thickness up to 1/16 inch, is suitable for the lining of pipes and vessels where corrosive liquids are handled. Ferrozincing is claimed to have the advantage that it is more permanent than an ordinary zinc coating. This process consists of coating the iron or steel with pure iron by a special method and then coating it with zinc. Pure iron is inert to chemical action as compared with zinc, and is slightly electro-positive to the underlying iron or steel. A zinc coating applied to a pure iron surface forms a more durable coating than zinc applied to ordinary iron or steel, as the electro-chemical action which is set up when once the zinc is penetrated is less. The process is claimed to be cheaper than hot galvanising.

* * *

THE RECOVERY OF SOLVENTS by means of Acticarbone is carried on in a very wide range of industries, according to an attractive folder which is being issued by Price, Stutfield and Co., Ltd., 6 Fenchurch Buildings, London, E.C.3, who are the sole representatives in Great Britain and the Colonies for Société de Rescerches et D'Exploitations Petrolifères, of Paris. Plants working on the Acticarbone process have been supplied to recover quantities of solvent as low as 10 gallons, or as much as 4,000 gallons per day. A map of Europe is reproduced in this folder showing the exact location of the different plants which have been erected, and a key index is appended to indicate the nature of the industries concerned. Amongst others, we notice works connected with the manufacture of rubber, artificial leather, asbestos jointing, canvas proofing, dry-cleaning, bakelite varnishing, oil seed extraction, perfume extraction, silk sizing and textile finishing.

* * *

A NEW copper-bearing steel, named Cuprador, is described in a brochure issued by Dorman, Long and Co., Ltd., of Middlesbrough, whose London office is at 55 Broadway, Westminster. The need has long been felt for a structural steel possessing anti-corrosive properties that might be placed upon the market at an economic price. Investigation on a large scale and over a number of years has established that these properties can be produced by the addition of a small quantity of copper, which has given rise to the name "copper-bearing steel" by which such steel has hitherto been known. Since commencing to manufacture copper-bearing steel Dorman Long & Co. have conducted tests which show that the amount of copper necessary to give the maximum benefit need not be high, excellent results being obtainable with a copper content ranging from 0.25 to 0.35 per cent. Cuprador steel will bend, punch, drift, draw and stamp, and lends itself successfully to all the ordinary processes of cold and hot working which are demanded of good quality mild steel, and in tensile and other mechanical tests it fully complies with the requirements of the latest British Standard Specification for Structural Steel No. 15 (1930).

* * *

DISMANTLED CHEMICAL PLANT on offer for sale by Oliver Ashworth and Co., of Bury, Lancs., is now illustrated in the lists which are periodically issued by this firm. Prospective purchasers are thereby assisted in deciding whether or not any particular item will meet their needs, or whether it is of a type which can be easily adapted for some special purpose they have in mind. Hitherto lists of second-hand and dismantled plant have been rather tiresome to wade through. The use of sketches showing the essential features of the plant, together with principal dimensional data, should certainly be encouraged, as such illustrated lists are worth perusing even when there is no immediate need for purchasing additional plant.

VITREOSIL CONTAINERS

Improvements in manufacture have made possible the production of containers or reaction vessels of large size. The picture shows one of 108 gallons capacity. It is 4ft. 6in. in height overall, and 2ft. 6in. internal body diameter.

We are exhibiting at Stand No.C.63, British Industries Fair, Olympia, London.

THE THERMAL SYNDICATE LTD.

VITREOSIL WORKS, WALLSEND-ON-TYNE

LONDON DEPOT : THERMAL HOUSE, OLD PYE STREET, S.W.1.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

ALLIANCE ARTIFICIAL SILK, LTD., Oulton Broad. (M., 27/2/32.) Registered February 12, £171 debentures, part of £303,000; general charge. *Nil. April 8, 1930.

London Gazette, &c.

Company Winding Up Voluntarily

POLYSULPHIN CO., LTD. (C.W.U.V., 27/2/32.) By special resolution, February 15. Frederick William Lord, 37 Walbrook, London, E.C.4, appointed liquidator.

Chemical Trade Inquiries

These inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country) except where otherwise stated.

BRITISH GUIANA.—A manufacturers' representative at Georgetown desires to obtain the representation for British Guiana of United Kingdom manufacturers of pharmaceutical lines. (Ref. No. 353.)

CANADA.—A Vancouver firm desires a United Kingdom agency for all Canada for super refined soya bean oil. (Ref. No. 358.)

EGYPT.—A Cairo firm of commission agents desires to obtain representation in Egypt of United Kingdom manufacturers of drugs and pharmaceutical preparations. (Ref. No. 382.)

SWEDEN.—A commission agent at Gothenburg desires to obtain representation of United Kingdom manufacturers of Turkey-red oil and cod liver oil. (Ref. No. 379.)

New Chemical Trade Marks

These lists are specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52 Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to March 10, 1932.

GASOPAK.

526,220. Class 1.—Opaque colours, chemical substances for use as opaquing agents for glass and enamel, vitrifiable colours or pigments and enamels (in the nature of paint). The firm trading as Vereinigte Chemische Fabriken Kreidl Heller & Co., 5-9 Sebastian Kohlgasse, Vienna, Austria; Manufacturers.—October 7, 1931. (Date claimed under International Convention, June 13, 1931).

ROYZINE.

528,041. Class 1.—Chemical substances for use in pickling metal. Sir S. W. Royse & Co., Ltd., 20 Albert Square, Manchester; manufacturers.—December 21, 1931.

SAVICO.

527,296. Class 1.—Size and sizing preparations for use in the manufacture of artificial silk. Tannerie et Maroquinerie Belges Société Anonyme (a joint stock company organised under the laws of Belgium), Saventhem, Belgium; manufacturers. November 20, 1931.

TRI-RAD.

528,287. Class 1.—Chemical substances used in manufactures, photography or philosophical research, and anti-corrosives. Stanco Incorporated (a Corporation organised and existing under the laws of the State of Delaware), Bayway, State of New Jersey; 100 West Tenth Street, Wilmington, State of Delaware and 2 Park Avenue, New York, State of New York, United States of America; manufacturers and merchants.—January 2, 1932.

VUTOX.

526,429. Class 3.—Chemical substances prepared for use in medicine and pharmacy, but not including liniment or embrocation and not including any goods of a like kind to liniment or embrocation. Pharmaceutical Corporation, Ltd., 39 Aldersgate Street, London, E.C.1; chemical manufacturers. October 16, 1931.

ZOIN

527,650. Class 3.—Chemical substances prepared for use in medicine and pharmacy, but not including skin lotions and not including any goods of a like kind to skin lotions. Society of Chemical Industry in Basle (a Joint Stock Company organised under the laws of Switzerland), 141 to 227 Klybeckstrasse, Basle, Switzerland; manufacturers and merchants.—December 5, 1931.

Company News

UNITED PREMIER OIL AND CAKE CO., LTD.—A dividend of 7 per cent. on the 7 per per cent cumulative preference £1 shares for the half year to June 30, 1931, is announced.

INTERNATIONAL PAINT AND COMPOSITIONS CO., LTD.—The board announce that the profits for the year 1931 were £90,364, against £110,905 for 1930. They recommend a final dividend on the ordinary shares of 6 per cent., making 9 per cent. for the year. In the preceding period an interim of 3 per cent. and a final of 9 per cent., making 12 per cent. in all, was paid, less tax.

SALT UNION, LTD.—A dividend of 9 per cent. is announced on the ordinary shares. It is proposed to place £10,000 to contingencies and to carry forward £14,000.

YORKSHIRE INDIGO, SCARLET AND COLOUR DYERS.—For the year 1931, the report states that the balance brought forward was £4,181 to which is added transfer from reserve £2,484 (leaving that fund at £3,000), making £6,666. After providing for depreciation of dyehouses, leasehold property, plant and machinery and all other charges, the trading resulted in a loss of £2,005 (against a profit last year of £7,192). To this is added the debenture interest £4,514, leaving a balance of £146 to carry forward. The annual meeting will be held at Atlas Chambers, King Street, Leeds, on March 4, at 12 noon.

SOUTHALL BROS. AND BARCLAY, LTD.—The directors propose, subject to the necessary resolution being passed by the shareholders, to distribute, by way of bonus, one ordinary share for every five ordinary shares held. In order to provide the necessary capital for the purpose, the directors propose to appropriate £26,000 from the company's internal reserve. The accounts for 1931 show that net profits have risen from £68,216 to £72,794. After paying the usual dividend and bonus of 20 per cent., tax free, and placing £40,000, against £30,000, to reserve, £27,394, compared with £27,100, remains to go forward. The annual meeting will be held at Birmingham Chamber of Commerce, New Street, Birmingham, on March 14, at 12 noon.

COURTAULDS, LTD.—For the year 1931 the profits were £1,101,587, compared with £2,274,408 in 1930, and £450,000 is transferred from contingencies reserve account, making £1,551,587. The dividends absorb £1,600,000, with the result that the carry-forward is reduced from £195,756 to £147,343. In view of the present world conditions, and the heavy decline in general values, the directors have decided to reduce further the values placed upon the company's interests abroad to the extent of £1,000,000, for which purpose the sum of £300,000 has been allocated from the capital reserve account, and a sum of £700,000 from the general reserve account. After the allocations from reserve the capital reserve will stand at £466,426, and the general reserve at £5,300,000. Contingencies reserve is included, in the balance-sheet, with creditors and preference dividend reserve. At the end of 1930, this item stood at £3,051,485; investments in, and advances to, rayon and industrial companies appeared at £22,144,113. A final ordinary dividend of 3 per cent., tax free, is payable on March 17.